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IMPORTANT!

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During the summer months, Farmer's Digest is mailed to you every 45 to 50 days instead of monthly. This practice, started years ago, keeps our subscription rates down by giving you fewer copies when you have less time to read. You will receive our June-July issue on or about June 20; our August-September issue on or about August 15. Following issues will again arrive near the first of the publication month.

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The **Farmer's Digest**

Volume 23 May 1959 Number 1

Substituting Fertilizer For Land

One additional ton of fertilizer could replace 9 acres of land . .

Condensed from The Furrow

Bernard Everett

FEDERAL farm programs have long been aimed at adjusting farm output by restricting crop acreage. Success has been elusive because of the technological revolution in agriculture. Farmers have maintained and even increased crop production while reducing crop acreages. They have done so by finding "substitutes" for land — commercial mixed fertilizer is one of the most valuable "substitutes."

Total 1957 crop production matched the 1948 and 1956 records, yet crop acreage was the smallest since 1919. High yields kept production up despite severe weather setbacks at planting and harvest. Increased use of fertilizer—nearly double the amount used 10 years ago—was one of the chief reasons for the high yields.

More Corn from Fewer Acres

Corn strikingly illustrates the effects of using land "substitutes." Corn allotments have been in effect since 1954 yet production in 1957, from 10 per cent fewer acres, was 6 per cent greater than in 1953, the year before allotments.

Corn farmers boosted production by, among other things, fertilizing more acres and increasing fertilizer per acre. In 1947, farmers applied fertilizer on 44 per cent of corn acres while in

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1954 (latest figures available) 60 per cent, nearly one-fourth more, was fertilized. In 1947, farmers used fertilizer on corn at the rate of 45 pounds per acre. In 1954, they used 80 pounds per fertilized acre, a boost of over 75 per cent. All corn harvested in U. S. in 1954 averaged about 39 bushels per acre while fertilized corn averaged more than 48 bushels per acre, nearly one-fourth more. In the Corn Belt and Lake States, the quantity of fertilizer used more than tripled from 1947 to 1954 and rate of application per acre more than doubled.

More Fertilizer Profitable

Corn producers could increase yields by boosting fertilizer rates even higher than they have so far, according to a recent USDA report.

The increase in yield (plus added income) obtained by boosting the fertilizer rate depends on such things as soil type, moisture, seed variety, and the amount of fertilizer already being put on the crop. A 10-pound boost in fertilizer rate from 80 to 90 pounds per acre will increase yield more than a 10 pound boost from 200 to 210 pounds per acre. The crop would be receiving nearer the maximum plant nutrients it needs at 200 pounds per acre so the increase might be of little value.

Extra returns from additional money spent for fertilizer decrease as the amount of fertilizer per acre increases, and the *maximum-profit* fertilizer rate is reached when one additional dollar spent on fertilizer application will add just one dollar to returns.

USDA economists found the *maximum-profit* fertilizer rate for the United States corn crop to be 300 pounds per acre compared with the 80 pounds used in 1954. This estimate does not take into account costs due to risk and uncertainty, and capital limitations which are important to most farmers.

Assuming that, to allow for risk and uncertainty, $2 of additional return must be obtained for every additional $1 spent on fertilizer application, the *best rate* for the *average* farmer would be nearly 190 pounds per acre, or more than double the 1954 rate. *Situations for individual farmers may vary widely from the average because of dif-*

The sewing machine, developed only about 100 years ago by Elias Howe, has done as much to alter our way of life as any invention. It freed women from the drudgery of doing all sewing by hand, and thus gave them the time to devote to other pursuits.

ferences in costs, climate, and soils. Bear in mind that other alternatives such as expanded livestock programs, new farm machinery, etc., may offer better profit possibilities than fertilizer, depending on individual farmers.

$3 Returned for $1 Invested

For the United States corn crop as a whole, $1 added to the 1954 level of fertilizer investment would have added $3 to returns, through increased yield, under average weather conditions.

Although Corn Belt and Lake State farmers have boosted total fertilizer use most, profit possibilities are still greatest in these areas. An additional fertilizer dollar, above the 1954 rate, would boost corn income an estimated $3.78 in the Corn Belt to $1.38 in the Northern Plains States.

Farmers have rapidly expanded their acreage in recent years, partly because of government restrictions. This has helped boost farm real estate values about 60 per cent during the past 10 years. In many areas, particularly where farm land is at a premium, farmers could increase output by using more fertilizer rather than buying more land. One additional ton of fertilizer at 1954 rates of application would have increased corn production as much as about 9 acres of additional corn land.

Rotten Egg Racket

The Food and Drug Administration is making headway in its warfare on a repulsive egg racket. Inspectors tell gruesome details of a nationwide traffic in incubator reject eggs sold for food purposes.

The under-cover operation extends from Maine to Central Texas and makes use of all sorts of subterfuge and trickery. Cash transactions to avoid written records, dummy corporations, aliases and phony addresses are characteristic.

The racketeers buy eggs rejected for hatching purposes, then take them to hideaways where they are broken out of their shells, chemical preservatives added to hide spoilage, and then frozen.

Addition of chemicals, mixing with good eggs, and baking may remove some of the off-odor and flavor, but the rottenness is still there, authorities say. —*Rutgers University*

Should You Milk Cows or Raise Heifers?

Many dairymen no longer do both . . .

Condensed from Farm Journal

Ray Dankenbring

IT'S enough to make you wonder just how much further we'll go with this business of specializing.

First a farmer sells off his hogs and chickens to concentrate on dairying.

Now he sells off his calves so he can milk more cows! Or else he sells his cows to concentrate on raising calves!

Calf-raisers aren't new to dairying. Farmers like Art Martin of Genesee County, N. Y. have been doing it for years. And high land prices have long since forced dairymen around big cities to keep only milk cows and let someone else grow the calves.

But the split-up in dairying is now popping up everywhere.

In general, the cow-milkers sell off their calves to:

- Save high-priced feed for milkers only.
- Expand their milking herds so they can have bulk tanks, go Grade A.
- Add to their milking string exactly when they want to (usually during the base period) rather then when their own heifers happen to calve;
- Save money on replacements. They think heifer-raisers can do a better and cheaper job.

Listen to their reasons:

I can't afford anything here that isn't milking," says Lee Albright of Yamhill County, Ore.

He began selling his calves two years ago when hay prices shot up to $55 a ton, worked out a deal with heifer-raiser B. E. Cabe to deliver a good springer whenever needed. Cabe keeps up to 300 on hand.

A dairyman outside of Seattle, Peter Henning, made a deal with L. J. Cotten who lives 60 miles farther out. Whenever Henning has three or four young calves, Cotten drives down, picks 'em up and boards them until they freshen.

"I'm sure Mr. Cotten can raise

Reprinted by permission from Farm Journal, Philadelphia 5, Pennsylvania

'em cheaper," says Henning. "We save money on fencing, pens and buildings."

Henning pays $10 a month per heifer and Cotten handles all veterinary fees and medicine. If a calf dies, there is no payment at all to Cotten.

Here's why raisers like it:

- The expense of Grade A bulk tanks and pipelines scares them.
- Like Cotten, they may live far enough from market that it's cheaper to ship heifers than milk.
- Older dairymen want to slow down.
- Perhaps most important, there's money in it. With high beef prices, dairymen have culled hard, and there's a booming demand for replacements.

Now let's listen to farmers:

"I got tired of milking," says Clyde Miller of Bates County, Mo., who sold out a 100-cow Grade A dairy to grow heifers. "I'm getting along toward retirement, and this looked like a way to cut down on work but still have a market for my feed."

Leon and Vern Peck of Calhoun County, Mich. were cream producers until prices pinched them into a decision: go Grade A or quit. "We couldn't justify the expense of converting to Grade A," says Leon.

So four years ago, they and three neighbors piled into a car and drove to Minnesota to look at the heifer business. They liked what they saw and came back with 60 yearlings that sold like hotcakes at a well-publicized auction the following August.

Since then, the five have gone it alone, buying mostly local stuff as yearlings. But they bunch together for the selling each fall.

Does it pay? "It's about like feeding steers—some years it's better than others," say the Pecks, who used to feed steers. "But it takes less labor, there's less risk and it gives you a market for roughages and cheaper feeds."

Many a man who lives it up, finds he must also live it down.

"You need a $100 spread between your yearling and springer prices to make money," they say.

Prices fluctuate less than for beef, say Richard and Claude Lester of New Castle County, Del. "Our heifers have sold well every year," says Lester.

Several ex-dairymen in the mid-country are buying heifers in the north, growing them out, then selling in the cow-short South.

Floyd Groff, a long-time dairyman, brings Wisconsin yearlings to his Putnam County, Ohio farm, feeds, breeds and dehorns them, then sells as springers on

order to Southern dairymen.

You find every kind of pricing deal, from outright sale to a simple boarding fee with the cow-milker retaining ownership.

Groff, for instance, pays $130 to $145 for yearlings in Wisconsin, then adds $10 a month for feeding plus a flat $60 a head for all other costs—including breeding, veterinary service and hauling—to get his selling price.

On the West Coast, where the business first started, M. E. Carpenter of Riverside County, California raises 600 to 700 calves at a time on a *custom basis.* The original owner retains ownership; Carpenter charges 50 cents a day per head for the first three months; 40 cents for the next three months; then $7 per month until they freshen.

When driving, steer clear of "tavern fog."

Claude B. Wilson of Skagit County, Wash. charges $8 a month for winter care and $3 on pasture for heifers under breeding age. For bred heifers, he charges $11 in winter, $4 on pasture.

Selling prices vary widely, as you can see. Frederick Phillips of Burlington County, N. J. put these flat fees on his springers this year: $325 for Holsteins; $285 for Guernseys; $275 for registered Jerseys; and $250 on grade Jerseys. They're dehorned and guaranteed to have four good quarters.

One reason for the variation, of course, is quality. And that's also one of the draw-backs to the heifer-raising business. Usually the buyer doesn't get any production records on the dams.

Arthur Hansen of Kane County, Ill. has come up with one answer: "The dam has to have a record of at least 400 pounds of butterfat before I'll buy the heifer." He had three top heifers at the state Holstein sale. They averaged $400.

Heifer-raisers will tell you that the business is no bed of roses. You can lose a heifer now and then. Some don't develop into the cows that dairymen want. Then there's Bang's vaccination, and testing, dehorning, taking off extra teats, plus the breeding costs.

Another problem is that you buy heifers as open, and they turn out to be bred.

Like anything, the heifer business can be overdone. But apparently that hasn't happened yet.

In fact, the most hopeful thing is that in their drive for bigger herds, the cow-milkers are having to give up part of their job. Rather than crowding out the smaller dairyman, they may be creating a better opportunity for him than he's ever had before.

Do It Yourself Test Plots

Set up experimental plots on your farm. This article tells you how . . .

Condensed from Crops and Soils

H. L. Thomas, University of Minnesota

HAVE you ever wondered just how other crop varieties, perhaps the newer ones, might compare with the varieties you're now growing? Or, will another grade and rate of fertilizer give better results than the one you've been using for corn?

These questions and similar ones can be answered by using simple test plots right on your farm. In addition to the practical accurate information obtained, there is a genuine thrill in conducting experiments to "see what happens."

These experimental field plots are easy to plan, and all that's required is a little common sense and careful attention to a few basic principles. Properly used, they can indicate which farm practices, (varieties, fertilizers, or chemicals) are best suited or most profitable for your farm.

State experiment station recommendations are an excellent basis for determining the proper farm practices to follow. But such recommendations are not foolproof, because they are oftentimes made for a larger area, such as a county, and hence not pointed for the conditions on your particular farm. Practical field tests of the recommendations, on your own land are the final proof.

Leave Check Strips

With every new farm practice you try, such as a new fertilizer, new crop varieties, or a new chemical spray, leave a check strip of the old method. This is the surest way to determine if the practice is paying its way. A test plot on your field, using your own machinery, can give you a "personalized" answer to question of which practice to follow.

It would be advisable to utilize the help of your county agent, agricultural instructor, or similar farm adviser in setting up the field plots. They can tell you how to establish and take care of the plots, and recommend the best varieties, fertilizers, or chemicals for you to test. And, they

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can help you to take yields and interpret the results.

The most important thing to remember in planning field tests is that every part of the experiment, except the variety, fertilizer, chemical, or practice being tested, must remain unchanged. If, for example, you are testing two varieties for yield, the soil for each plot should be the same. Otherwise, the difference in yield may result from soil variation and not the varieties themselves.

To get away from this, your treatments should be side by side on strips nearly alike in soil type. Soil types are bound to differ from one end of a field to the other, but with planning and care in locating the test plots, the soils will not vary greatly from treatment to treatment.

Only One Factor

Just keep in mind, the only thing which should affect the comparative yield or performance is the treatment itself. Other factors which can't be measured must be kept the same for all treatments.

The air above an acre of land contains an estimated 34,500 tons of nitrogen.

For most on-the-farm experiments, testing only one factor is recommended. That is, test only the differences in yields between varieties, or the difference in several rates of planting or fertilizing. This method will give an easy comparison and a quick analysis of the tested factor.

Although not recommended, more than one treatment can be tested on a plot at the same time. An example would be several varieties at several rates of planting such as 0, 50, and 100 pounds of nitrogen fertilizer, each tested with planting rates of 12,000 and 16,000 corn plants per acre. But, these multiple tests are more difficult to interpret without expert help.

You will probably get more usable information by having two or more experiments each testing one factor. That is, one experiment testing the varieties (or populations) at one level of nitrogen and a second experiment to test the same varieties at another level of nitrogen. It is best not to put over 10 to 12 treatments (10 to 12 varieties, for example) in one experiment. Otherwise, the plot area becomes too large or variable for fair comparisons.

Fit to Machine Size

Plan the width of the treatments according to the size of your machinery. For testing varieties or fertilizer rates, two rows of corn or other row crops may be ideal for each treatment. Place the treated rows next to each other. For small grain or other

drilled crops, a 12-foot drill and a 6- or 7-foot combine will work fine if care is taken to harvest a full combine width from each treatment. Make the plots long. This helps to do away with the affects of soil variation.

For accurate fertility experiments, the fertilizer should be applied in measured amounts. On your own farm experiments, it may be simpler to vary the fertilizer by machine adjustment and get comparative results. In this case you are actually determining the response to fertilizer at specific adjustments rather than getting exact yields per pound of fertilizer. The results will be similar, but the interpretation in terms of dollars and cents would have to be estimated, because few machines meter out materials at exactly the rate indicated.

Repeat the Treatment

Thus far, we have outlined some tips for laying out a single experiment. But, with only one test, something may go wrong and you would not realize it unless you have repeated the experiment. The information you get will be more reliable and valuable if you repeat the experiment two or three times in the same field. Researchers call this replication. These "repeat" tests, or replications, will give you a better idea of what to expect from a given field if they are placed at several locations in the field.

Try to keep the replications (repeat experiments) on areas of similar soil type and past management. The results can then be used as a future guide to management of that soil type and field. The yields from two or more "repeat" experiments on a field can be averaged and this figure will give a truer picture of your comparative yields than will the results from a single replication.

The interest on our National Debt costs about $12,000 per minute.

Watch Arrangement

One precaution though—treatments in each replication of the experiment should be arranged in a different (random) order than is used for other replications in the same field. This would do away with any "bias" or partiality which might result from putting the treatments (such as varieties) in the same order each time.

Also, it is wise to move the replications, or tests, to a different part of the field or farm each succeeding year. This will reduce the possibility of the same area receiving the same treatment, such as heavy fertilizing, year after year. It also mini-

mizes errors and assures more reliable results.

Give Identical Care

In caring for the experiment —cultivating, spraying, or other operations not a part of the treatment — make certain that each replication, or series of test plots, is given identical care. Even small things, such as not cultivating one treatment until you can cultivate the entire replication are important.

The experiment does not need to be isolated from the rest of the field, but it is important to label and record the treatments carefully. Slipping up on this one detail will make your experiment a waste of time. If you do isolate your experiment, don't leave one of the treatments on the edge of the field, because the outside rows are almost certain to yield differently than the inside rows—even where the same treatment is applied.

Good wood posts often outlast steel ones.

Harvest with Care

Now comes the pay off, harvesting the experiment. More care is needed in this part of the experiment than in any other step. One "peck" of error may give a bushel of false information.

One good harvesting "tip" is to cut or pick identical areas of all treatments in exactly the same way. Weighing is the most accurate means of measurement. Volume measurements (bushels, bags, or cubic feet) may be satisfactory for some experiments, but weights are usually better. And, be sure and take the moisture content of the grain or forage into account when weighing samples from a treatment.

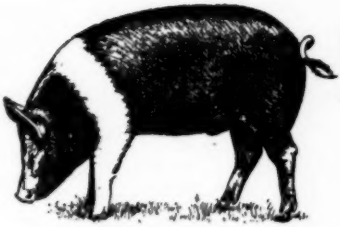
Interpret Results

After the harvesting is done and the yields recorded, the results of the experiment can be evaluated. Results should always be interpreted in the light of the kind of a growing season you have had. This is one place where trained agricultural workers can really help.

In summary, the main points for setting up your on-the-farm field experiments are these:

1. Do not try to test too many factors in one experiment.
2. Select uniform soil areas for the experiment, and duplicate the experiment on other parts of the field if possible.
3. Give all test plots identical care throughout the growing season, being careful not to "favor" any one treatment or variety.
4. Harvest identical areas from each treatment. Harvesting methods and weight measurements should be precise.
5. Interpret the results in view of the growing season for that particular year.

Coming: Machine-Fed Hogs!



Farmers are getting ready to turn swine feeding over to time clocks and electrically-driven conveyors . . .

Condensed from Capper's Farmer

George A. Montgomery

IT was time to feed the hogs when I got to the Thomas G. McManus farm in Rush county, Indiana. The trough was cleaned out and pigs had picked up the last grain of corn from the concreted lot floors.

But don't get the wrong kind of picture. Tom McManus isn't the kind of fellow who dumps corn from a basket into a hog trough.

Carry corn by hand? That's one of the last things he would think of doing.

An auger and electric motor can move it a lot cheaper. And faster, too.

The 4-inch auger that McManus uses cost 95 cents a foot. Pipes from the auger which carry feed to the concrete trough be low cost about 50 cents apiece. These pipes are made from lengths of rainspout. Their use and the way they are constructed are two things that are new to this business of machine-feeding hogs. They make it possible to put out feed to last the pigs any desired length of time—2 hours, 6 hours, or around the clock.

That's important to McManus. He's feeding high-moisture corn from a glass-lined metal silo. He wants pigs to clean it up while it is fresh and soft.

His type of feeder may be important, too, to men who feed dry corn. Grain may be augered from a bin as well as from a silo.

The same type of machinery could be used to feed a ground, dry, complete ration. Poultrymen for several years have been using automatic equipment for broilers and laying hens. They use time clocks to start machinery and stop it at whatever intervals are desired.

Some hogmen now use a small mixmill that will meter two kinds of grain, grind them together, and blend them with the correct amount of protein. It is set up

Reprinted by permission from Capper's Farmer, Topeka, Kansas

beneath bins so grain may be spouted down to it. It would fit well into a machine-feeding unit.

The machine-feeding idea has moved fast in the last few years. It was a natural. Many farmers and a few engineers began developing their own ideas. The great activity now under way is sure to produce equipment that will do the job as hogmen want it done. Final answer may be the McManus type of machine or some other type.

And it may be important for reasons other than labor saving. Here's one of them: Experiments have shown that hogs which get less than a full ration make more pork from the feed they eat. That can cut costs. And the carcasses aren't so fat. That could mean better pork and increased demand.

Up to now, there has been no way to limit the ration except by hand-feeding. That costs too much in time and labor. Time-clock machines could be the answer. Some smart fellow using a low-cost type of distributor such as that at the McManus farm, may be expected to come up with a device that will put out less than the pigs want several times a day.

British tests have shown that some kinds of livestock, fed small amounts frequently, gain faster than those allowed to fill up. That might be the way to high-quality, low-cost pork. A machine like McManus uses is so cheap that a grower could afford to make it long enough for all hogs to eat at once. McManus designed his own downspouts to regulate the amount of grain put out at one feeding.

The grain trough he uses is of poured concrete. A sloped panel made of car-siding 30 to 36 inches high keeps pigs from

Thirty minutes of exposure to sun or wind can kill small roots of pine seedlings.

getting at the downspouts and auger. The feed opening closely resembles that of a conventional self-feeder.

When I visited McManus, he was planning to extend the auger and feeder from a length of 40 feet to 72 feet so as to increase the number of hogs he can handle.

He has another device that may be widely used by hog farmers. That's a measuring device. Feed coming from silo flows into weigher from old thresher separator.

A half bushel of corn of 14 per cent moisture would weigh 28 pounds. If the corn tested 30 per cent moisture, each half bushel would contain an extra 8 pounds of water. To measure the grain accurately, McManus

sets the weigher at 36 pounds. He uses the weigher's counting device, too. It shows how much corn a bunch of hogs has eaten at any given time.

McManus and his brother, Mauzy, operate two farms—totaling 730 acres — in partnership. On Mauzy's farm they are building similar equipment. The auger and feeder there will be 94 feet long.

It took about 2 minutes for Tom to put out enough grain for 250 hogs. All that was needed was to turn switches to start the feeding machinery and the built-in unloader on the silo.

John Oliver of Arlington, Iowa, had a storm hit his farm. The wind blew his barn completely off its foundations. He let it go—that is, remain where it set, and later, another wind put the barn right back on its original foundations.

Karl Gebhart, Preble county, Ohio, bought a manufactured metal feeder to mechanize his hog operation. It is a lid-type that is filled by auger. There is a pressure switch to shut it off when it is filled to the end of the auger.

Little capacity is needed in a machine-type feeder. This one is low. There are 33 lids on each side. It may be set in a fence line so hogs can feed from either side, or it can be set up in two pens at right angles to the fence.

Gebhart wanted to increase his swine project from 40 litters twice a year to that number four times a year without the need to hire extra help. He put the feeder on a new concrete fattening floor where pigs are penned the last 90 days of the finishing period.

He feeds moist corn from an oxygen-tight silo. He flips switches to start the feeding machinery, and the pressure switch cuts off electricity when the feeder is filled to the end.

One area where many hogmen are interested in machine feeders centers around Eureka, Illinois, where Jerry Harper and Merle Sauder operate a farm to test equipment they sell. They have been experimenting with various types of livestock feeding machines.

One is a hog feeder which they have modified several times in an attempt to make it into a foolproof outfit suited to time-clock control. They bought a big auger made to feed cattle a mixture of silage, chopped hay, and concentrates.

The first section of auger pipe is turned to place the discharge openings high on the side of the pipe. Each section, in turn, is set so the openings are a bit lower.

The pipe runs fullest at the end where grain is fed into it, and almost empty at the far end. As a result, about the same amount of feed is discharged through each opening. As soon as the auger starts, grain is discharged along the full length of the trough.

The floor of Harper and Sauder's experimental hoghouse slopes down to a shallow manure gutter, and dung is carried out of the building by a shuttle-type barn cleaner. Another new thing is a spray device to cool hogs in hot weather. It operates by thermostat, and starts a fine mist when the temperature becomes uncomfortable.

Topdressing Will Improve Pastures

Well-fertilized pastures will furnish better grazing for a longer time than those which have not received enough plant food.

Pastures which are well-fertilized will furnish grazing two weeks later in the fall, and will be ready to graze two weeks earlier in the spring. They also have greater ability to recover after a drouth.

These facts add up to some timely advice—topdress your pastures. Use the upper limits of the following recommendations if your soil is low in fertility. If you have already fertilized liberally and your soil is very fertile, the lower limit may be enough.

For ladino clover-tall grass mixtures, use 400 to 800 pounds per acre of 0-14-14 or 2-12-12 fertilizer or from 200 to 600 pounds of 0-20-20 fertilizer each year. If the pastures have been closely grazed, nitrogen will stimulate growth, and 10-20-20 or 5-10-10 may be substituted. If a soil test indicates a low potash level, use 0-10-20 instead of the other analyses.

For orchard grass-lespedeza, topdress annually with 300 to 500 pounds per acre of 5-10-10, or 150 to 250 pounds of a 10-20-20 equivalent.

For bluegrass and white clover, or native grass and legume pastures, apply from 700 to 1,000 pounds per acre of 0-20-10 or 0-20-20, or from 900 to 1,400 pounds of 0-14-14. If there has been no previous pasture improvement, topdress with 400 to 500 pounds of a 10-20-20 or 10-20-10, or with 800 to 1,000 pounds of a 5-10-10 or 5-10-5 or equivalent.

If you are in doubt about the pH of your soil, have it tested. Apply the lime needed to bring the pH up to 6.0 or 6.5. Soil tests will also show if the soil needs phosphate and potash.

—Virginia Polytechnic Institute

FUN ON THE FARM

A Collection of Jokes and Humorous Farm Stories

Two parsons were having their noon-day lunch at a farm during their yearly visit to homes of their parishioners. The farmer's wife cooked a couple of fat chickens, thinking that the family could dine on the remains after the visitors had gone. But after a busy morning, the parsons were hungry and wolfed the chickens bare.

Later as the farmer was conducting his guests around the farm, an old rooster commenced to crow in all his glory. "Seems to be mighty proud of himself," said one of the guests.

"No wonder," growled the farmer, "he's got two sons in the ministry."

★ ★ ★

A boy becomes a man when he'd rather steal a kiss than second base.

★ ★ ★

This story is told of a country publisher who was also a great practical joker.

A local farmer, immediately after being elected to a high office in his state-wide cooperative, got a slight case of the swell head. The publisher, planning to deflate his friend's new ego, substituted a picture of an angry old boar for the farmer's picture in a very few copies of the state magazine announcing the farmer's election.

He then allowed a few of these extra-special copies of the magazine he was printing to get into the hands of the townpeople and the farmer himself. A phone call from his friend was prompt and loud. After listening a few minutes, the publisher admitted that getting a hog's picture over the caption about him was bad, then added, "and I have to tell you. We used your picture over the caption about the hog."

When the full story got around town, the new officer was somewhat deflated but still had his old friends.

★ ★ ★

Middle-aged is when you have that "morning-after" feeling without being out the night before.

★ ★ ★

"Your references are good, I'll try you," said the farmer to a young man who was applying for a job on a dairy farm.

"Is there any chance to rise, sir?" the young man asked.

"I'll say there is," replied the farmer. "You'll rise at quarter to five every morning."

★ ★ ★

The story is told of an old fellow who was digging a well for a farm home. While he was away eating lunch, the ground caved in around the twelve foot hole he had already dug.

Never one to let an opportunity like this pass, the old gent put his hat and coat on the edge of the cave-in, and retired to the haymow near the barn to get a little sleep.

The farmer for whom he was digging the well came by in mid-afternoon. Seeing the hat and coat, he imagined the worst, and immediately fell to digging like mad for the probable corpse of the old well digger.

At last, when the caved-in dirt had been removed, the well digger showed up, yawning: "Well, now, had I known you thought it was I down in the pit, I'd of come sooner."

★ ★ ★

A cow, like a ship, has a stern
and a bow,
And a tail in place of a rudder;
You fill 'er at one end with hay
from the mow,
And empty her at the udder.

★ ★ ★

The tense moment had been reached in a murder picture at a little Iowa town theatre.

Among the crowded seats, an elderly gentleman began groping for something on the floor. He was disturbing the lady in the next seat, to the point where she finally inquired testily, "What have you lost?" "A caramel," said the man.

"You're going to all this bother for a dirty caramel on the floor?" she asked. "Yes," was the reply, "my teeth are in it."

★ ★ ★

A child is something half way between an adult and a television set.

★ ★ ★

A hired hand received his paycheck and upon inspecting it found it to be ten dollars too much. He decided not to say anything about it to the boss. When he got his next check, it was two d o l l a r s too small. Promptly he went to the boss. The boss said, "We have been checking our records and find we paid you ten dollars too much last month. How come you didn't come in then?" To this the hired man replied, "Well, anybody can make one mistake but when he makes the second that is too much."

★ ★ ★

You had better learn from the mistakes of others. You can't make them all yourself.

—*Puritan*

Some farm leaders have a great gift for expressing themselves with eloquent clarity. This rare gift is shared by Doc. (W. E.) Peterson, University of Minnesota cow expert.

I remember one time during a farm institute at the Fort Atkinson (Wis.) municipal building when three able professors, without Peterson's gift for clarity, were on the stage conducting a question and answer session. Doc Peterson sat in the front row of the audience below the stage.

Way back in the hall an aging German-born farmer stood up with a question. This was right after the beginning of milk inspections, and the farmer was being penalized for contaminated milk. Laboriously, the farmer spelled out the long and difficult words on the report. The professors on the stage tried to explain, but the longer they talked the more they perspired and the less the farmer understood. Finally, a friend leaned over and tapped Doc Peterson on the shoulder.

"Try your hand at explaining."

Dr. Peterson rose and pointed his familiar black pipe at the aging farmer.

"You know that stuff you got on your cows' tails?" he called across the hall.

The farmer nodded energetically. "Ya, ya."

"You got it in your milk!" Doc shouted at him.

The farmer understood perfectly.

—Leroy Gore

★ ★ ★

Women are to blame for most of the lying which men do. They insist on asking questions.

★ ★ ★

A city-bred college lad took a summer job as a hired hand on a Texas farm. Arriving hot and tired, he ate a huge dinner that night and went right upstairs to bed. Toward morning he was rudely awakened by the farmer shaking him.

"Hey, son, it's past four o'clock."

"Four o'clock!" cried the boy sleepily. "You better get to bed, Mr. Parker. We've got a lot of work to do tomorrow!"

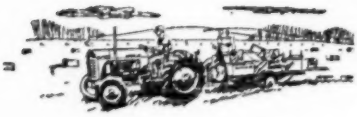
★ ★ ★

A bachelor is a guy who opens his own cans and his own mail.

★ ★ ★

One day a little boy was seen walking down the road with a mongrel dog. A man saw him and asked, "Little boy, where are you taking that dog?" The little boy replied, "To the dog show." "Surely," said the man, "you don't think he will get any prize, do you?" The little boy replied, "No, but he will meet lots of nice dogs."

Should We Go To Smaller Bales?



Cube-shaped hay bales, weighing 9 to 14 pounds, could cut hand labor considerably . . .

Condensed from
Pennsylvania Farmer

Morris E. Schroeder,
Pennsylvania State Univesity

EVERYBODY seems to agree that handling hay on the farm is still one of the big labor-requiring tasks. Little real progress has been made in automatically handling the ordinary 30 to 40 inch bale. A bale is usually handled eight separate times by hand from the time it is baled, put into storage, taken out of storage and finally fed to the cow. This means that for each 100 tons of hay produced, 800 tons must be handled by heavy manual labor. If handling the bale is such a problem, why go to smaller bales yet?

The small or cubic bale may be a solution to the problem if we can handle it by random packing in wagon, hay dryer, and mow storage. This means that the small or cubic bale cannot be treated as an individual handling package, as is the case with the standard length bales. It must be handled in bulk, so to speak, with equipment designed to automatically load, unload, elevate and otherwise transport into and from storage.

How to Handle Small Bales

What might a typical system be for handling the small bale automatically, assuming high quality forage is the objective?

First, the field operation may be an ordinary baler with bale-throwing attachment which will automatically load the bales on the wagon in a random or jumble pack. This means that only one man, the tractor operator, is needed for the entire operation. Moisture content of the hay when baled is approximately 40 per cent.

Second, the wagon may be located on a heated air crop dryer to reduce moisture to safe storage which is typically accomplished in an overnight drying time.

Third, the wagon may be unloaded mechanically into an elevator which will distribute the bales in storage in a random pack.

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Feeding Operations

Fourth, if storage is correctly located in relation to feeding operation, the cubic bales may fall directly into feed racks, or with minimum labor be moved the short distance to the feeding point.

Fifth, it seems likely the small quantity of hay may be easily shaken from the strings by the cow herself, eliminating the string removal problem. It may even be desirable to adjust size of bale to correspond with typical individual feeding quantity, say eight to ten pounds each.

In 1958 limited experiments were conducted at the Farm Center of the Pennsylvania State University in which small bales were successfully random packed on wagons at approximately 40 per cent moisture and artificially dried in the same time as required by regular 30 inch length bales. The small bales ranged in length from 15 to 20 inches and were made in a common 14 by 18 inch bale chamber. Many of the presently available commercial balers have a wide range in bale length adjustment which includes the short lengths mentioned. The weight of this bale at densities satisfactory for artificial drying was 9 to 14 pounds.

In 1948 it took 30 minutes working time to buy a pound of meat. By 1957, the time was down to 19 minutes.

As is the case with any hay baled for artificial drying, the density must be watched carefully. If too tight or dense a bale is made, the air will not penetrate to the center of the bale, resulting in lower drying efficiency, non-uniform drying and a longer drying time. All these factors add up to additional costs in terms of fuel and electricity per ton of hay. A bale density when dry of approximately five pounds per cubic foot was used on the small or cubic bales dried this past season. This density should be checked periodically by actually weighing several bales during the baling operation.

Twine cost must also be considered. The smaller the bale the more twine required per ton of hay. However, the tensile strength necessary in twine to hold the small bale is considerably lower than the strength of our present baler twines. Therefore, lighter twine such as binder twine may be used, which reduces the cost per foot of length. Using the lighter twine can offset this cost factor and may even lead to new-weight twines which result in less twine cost per ton of hay.

Random-Packed Bales Dried Easily

The small bales were artifici-

ally dried with heated air on a wagon hay dryer system located in a permanent shed to allow recirculation of the air. The temperature of the air was controlled in the duct by a thermostat. The average temperature of the air entering the hay was approximately 150° F. Even at this temperature the oil burner was off up to 40 per cent of the time when air coming out of the wagons was recirculated. The wagons were attached to the system by drop canvas usually by 5 p.m. with drying completed by 8 to 10 the next morning.

Why Hurry to Breed Cows?

Why hurry to get your cows bred? Nobody gains—everybody loses! Your cows need at least a 60-day rest period after calving. Give it to them and it will mean dollars in your pocket.

Cows need and demand a period of rest after calving. The need is based on research work with the uteri (wombs) of many cows. The uterus does not return to a normal, healthy state until 60 days after calving. It takes longer in many cases of calving trouble, retained placenta, and multiple births.

What happens when cows are bred (before) 60 days after calving? There are several established facts: (1) More services are required for conception; (2) The interval between calving and conception (established pregnancy) is actually longer than when allowing 60 to 90 days rest; (3) Longer intervals between heat periods occur, such as 26, 34, 40, 56, 80 days, etc.; (4) Your cow does not breed back as quickly as advisable; and (5) Your artificial breeding technician suffers by returning more often . . . thus more time spent and more miles driven.

Why not resolve today that you'll give all your cows at least 60 days rest? —*C.O.B.A. News*

The hillbilly father was furious as he approached his sons. "Which one of you pushed the outhouse into the creek?" he asked.

"Me, paw," spoke up Zeke.

"Wal, boy, come into the woodshed. I'm gonna tan your hide good."

"But, paw" countered young Zeke, "George Washington's paw didn't lick him when he told the truth."

"Maybe not," replied the father, "but when George cut down that cherry tree, his old man wasn't settin' in the branches."

Selecting Breeding Stock

"Produce a type of beef cattle that will be more useful to mankind," says this animal husbandryman specialist . . .

Condensed from The Polled Hereford World

A. V. Allen, North Carolina State College

THE first thing we should do when we decide to go into the cattle breeding business is to have in mind some objective or goal that we intend to strive for. We need to consider why we are in the breeding business and which one of the many phases of this business we are going to concentrate our efforts on.

My idea of a good cattle breeder is one that has as his objective to improve the breed of his choice and to produce a type of beef cattle that will be more useful to mankind in general and will produce beef at a profit. I think it would be well right here to point out that for every breeder that makes a major contribution toward this goal there are thousands that spend their lifetime in honest labor, but succeed only in producing cattle. Cattle breeding is a long time project, not at all suitable for in-and-outers.

I think that we can further divide the cattle breeder into two types: (1) The breeder who is mainly interested in producing commercial or range bulls, and (2) The breeder who is mainly interested in producing seed stock, both male and female, to replenish and build up the stock of the commercial bull producer. I believe that both types of breeders should have a common goal, but in the selection of seed stock emphasis may be placed on different points. The following are the factors I believe both groups should consider in selecting their breeding stock:

1. First of all I think we should keep in mind the purpose of a beef cow—to many of us she is a thing of beauty, but few of us are in position to keep cattle for their beauty—we keep them because they are useful; they are useful to provide us a better market for feed that otherwise might

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be wasted. The first item to consider then in selection is usefulness.

What do we mean by a useful animal? The beef business is big and complex and different people want different things—

(a) The backbone of the beef business is the cow and calf man. A useful animal to him is one that will give him a high percentage of calf crop, heavy weaning weight, quality to grade in the top grades and ability to produce this on cheap rough feed.

(b) The steer farmer buys calves, winters them cheaply, grazes the next summer and then resells. He wants ability to utilize cheap feed, a high conversion ratio of feed to pounds, vigor and resistance to disease.

(c) The feeder wants to buy good frame and hang on it cheap gains to resell at a higher price. He wants conformation, quality, high feed conversion and fast growth.

(d) The packer wants high yield of edible meat from live animals; he wants the majority of the meat concentrated in the high priced cuts and the very minimum in the low priced cuts. He wants conformation, quality and yield.

(e) The end of the road is with the housewife — according to the consumer surveys she wants a lot of lean meat with a high degree of marbling, but no outside waste fat.

It is unfortunate but true that the purebred breeder must look all the way down the line when he makes plans for production of seed stock and to further complicate matters, each segment changes their mind about what they want every few years, so that it is not possible to produce an animal that will satisfy everyone. We must make compromises; for example, the packer is not at all interested in feet and legs, in fact if it were possible he would just as soon not have them at all, but to the cow and calf man and to the steer farmer feet and legs are a major factor.

Per capita consumption of chicken and turkey increased by 2.6 pounds last year.

Therefore, in deciding the useful factors that I said should be our first consideration in breeding animals, let's concentrate on the ones that are of major importance to the most people and they, in my opinion, are:

(a) Conformation

You may prefer to call it type or build, but at any rate it is the only single factor that is of interest to all groups—so certainly it is the first factor to consider. Conformation means the

build of the bone and muscle structure of an animal. Volumes have been written and more have been spoken about the kind of conformation we should breed for. We went too far in the direction of the packer's desire a few years ago and now that tendency is to swing too far in the other direction and talk about horsey type animals that look like they were selected more for use as work oxen than as meat producers. I am definitely one of the middle-of-the-road school, I believe in 1,200 pound cows and 1,800-2,000 pound bulls, but have not been convinced yet of the need to go for more size than this. Along with this size I believe we can keep the smoothness and easy fleshing qualities that are lost on larger cattle. On a frame of this size I believe we can get the width and depth of

Corn may be seriously damaged or killed when too much fertilizer is placed too near the germinating seed.

body to allow for the easy calving and good milking tendency demanded by the cow and calf man—the distance demanded by the grass steer men—the capacity for feed demanded by the feeder—the high ratio of meat in the high priced cuts demanded by the packer and the big lean muscles desired by the housewife. By selection, I believe we can obtain a middle-of-the-road type that will be acceptable to all.

(b) Fertility

A breeding animal that will not breed or is a slow breeder is a major economic factor that we should consider. No cow and calf man will stay in the business producing a 60 per cent crop. He should be able to produce 90 per cent or above. Fertility is highly inherited and too little attention has been paid to this in the past. Bulls that are slow to settle cows and females that are slow to conceive, cost us thousands of dollars each year. Especially in the selection of your replacement heifers I would pick heifers from cows that breed early, settle quickly and have no calving trouble.

(c) Milk Production

We hear a lot about weight for age and gaining ability of cattle this day and time. To a large degree the weight of a calf at weaning time is in direct proportion to the milking ability of his mother. The major effect of the bull is evident after we wean our calves. I would select replacement heifers from my best milking cows and in selecting a bull I would like to know about the milking ability of his mother.

(d) Rate of Growth

As I have mentioned, we hear a lot about this and I know that

we are going to hear more. To me it is a very valuable tool to use in selection of our breeding stock, but I get worried about the tendency for some people to use it as the only tool. I believe that even this prejudiced group would admit that a Holstein steer will grow faster than a Hereford steer, but when it comes to putting the most meat in the high priced cuts and the flavor that correct marbling will give, the Holstein would have to take a back seat. I think we need to couple rate-of-gain with type, giving no more than one-half credit to rate-of-gain to stay with the middle of the road cattle.

In using rate-of-gain records to select breeding cattle, we need to also remember that they are valuable in making comparison on one farm only. You cannot compare rates-of-gain on a farm in Texas with those obtained on a farm in North Carolina.

(e) Vigor and Health

We need to remember that we want our calves born in the winter time in North Carolina. We expect the cow to drop her calf out in the pasture and expect that calf to survive. We need to select cattle that are wide between the forelegs, have a bold spring of ribs and strong in the heart girth. We should stay away from selecting heifers and bulls from animals that have a tendency to develop foot and leg trouble.

The major consideration in selecting breeding animals is their usefulness and the factors that contribute to it are type, fertility, milk production, rate of gain and vigor of the animals.

2. Pedigree

I do not mean to imply that we should always give all the consideration to the individual characteristic of the animal. The breeder that is mainly producing commercial bulls will put more emphasis on the individual. The man that is producing seed stock will consider the pedigree of equal importance.

Poultry scientists recommend brooding chicks at least 300 feet from adult chickens and on grounds uncontaminated with poultry manure to reduce the risk of contracting leucosis.

Certainly in the selection of our herd bull now we need to look at the bloodline to determine an idea of our chances of getting dwarf calves. Just at this point I want to mention that I would not get rid of all of my cow herd on the basis of pedigree. We are inclined to condemn all cattle of certain bloodlines when actually chances are that a majority of them would never produce a dwarf. I have great faith in our research people

and believe that in a matter of a very short time they will discover an accurate method of determining dwarf-carriers. Cattle from some of these bloodlines must have had characteristics we wanted or else they would never have gained such popularity. I think we should try to hold these while we get rid of the dwarfs and believe this can be done when an accurate test is available.

We can judge an animal as it is, but not his ability to perform. This ability can best be determined by the records of the sire and dam. Therefore, in selection of breeding stock we could do a much better job if we knew something about the production record of the parents and grandparents. Select heifers from a cow that consistently produces good calves, not just one good calf along with a host of sorry ones. Select animals from a bull that has produced show winners —this should take precedence over the show record of the bull himself.

Brooder houses should be at least 100 feet from other buildings and from each other. This helps prevent fires and disease from spreading to other buildings on the farm.

In looking at a pedigree—three generations are far enough to go back. A bull in the fifth or sixth generation exerts very little influence on the animal in question.

3. Breed Characteristics

These are important but in selection should be down the line in consideration. I know that a lot of people believe that if you don't have the correct color markings you don't have a Hereford. I like to think that if you don't have a beef animal you don't have a Hereford either. Therefore, I would look first at the usefulness, second at the pedigree and last at the color markings. To me, a yellow, mellow thick type bull is as much a Hereford as a deep cherry red bull that may be way down the line in the other cheracteristics. Yet, we have a lot of people that refuse to buy a yellow bull regardless of how good he is. And in other areas the same is true with red bulls. The objective is to produce beef, beauty is secondary.

In selection we should remember that we never get perfect—there is only 100 per cent in every animal and if we get more of one thing we must take less of something else. Try to correct the major weakness—if you have a group of cows that are inclined to be crooked in their hind legs but have excellent heads, pick out a bull that is

very straight on his legs and if necessary let him be a little long in his face. Select your bull to correct the major weakness of your cow herd.

Finally, I would like to repeat again that cattle breeding is a long time program. Selecting a bull is a lot like picking the winner in a horse race, you study the animal and go over the past records and think you have a winner, but the pay-off is in the performance.

Hay Short? Cull Loafers

If quality and tonnage in the hay mow are going to be short this winter, culling some of the lowest producers is the most dependable means of solving the problem, advises G. A. Williams, Purdue University extension dairyman.

This principle applies to large and small herds alike, Williams points out. He uses a herd of six cows to prove the point.

The average cow in Indiana produces approximately 7,000 pounds of milk annually. If that is the average, many cows produce more. Therefore, some must fall below that level. Suppose three of the six cows produce 7,000 pounds each; one yields 9,000 pounds and the best cow in the herd 11,000 pounds. But don't overlook that sixth cow. She is the loafer. Four thousand pounds are all she could make for her owner.

Numbers are no guarantee of profits, Williams warns. Feed cost makes up about one-half of total yearly production costs. The other 50 per cent goes for labor, overhead, depreciation, etc.

Using 1957 Indiana DHIA figures, the belle of the herd, with 11,000 pounds of milk, yields her owner $169 net income. Second best, perhaps a younger cow making 9,000 pounds, shows a balance of $97. The three cows (half the herd) together mark up only $54. Now comes the loafer—her 4,000 pounds cost her owner $55. If the two good producers made up the entire herd, the owner's net return would reach $266. When the other four cows are included he ends up the year with only $265, one dollar less net, but four cows more to milk.

Beef prices being what they are and many hay mows not too well filled, culling 10-20 per cent of the low producers is the best way to help solve feeding problems, Williams concludes.

Purdue University

Testing for Nitrogen

It isn't easy, but there are ways to measure available soil nitrogen . . .

Condensed from Prairie Farmer

DETERMINING how much help your soil needs in supplying nitrogen for a high yielding corn crop is no easy problem. Soil nitrogen has been eluding the test tube for years. It is skittish about being analyzed.

The soil-testing laboratory at the University of Wisconsin, Madison, Wis., is one of few laboratories where you can have your soil samples analyzed for nitrogen along with the usual tests made for lime, phosphate, and potash. The results and the fertilizer recommendations based in these results are not solidly accurate.

Dr. O. J. Attoe, who has done much research in developing soil nitrogen tests, is quick to admit that the test for nitrogen is the least satisfactory of the tests made on soil.

It is valuable because it reminds the farmer that adequate nitrogen is especially important for a good corn crop. It acts as a guide to predict how much nitrogen fertilizer must be added.

Why is nitrogen such a fugitive when soil tests give a fairly accurate picture of lime, phosphorus, and potassium needs? Nearly all soil nitrogen occurs in organic form in the organic matter. This organic nitrogen is not available to the crop. It must be broken down by soil microorganisms to the nitrate form which can be utilized by plants.

Liberation of nitrogen fluctuates with the activity of these organisms. They work ambitiously when soil temperature is moderate. Too much water cuts off their oxygen supply. They are sluggish in cold weather.

The type of organic matter in the soil affects their work. During the early stages of decomposition they actually use nitrogen, keeping it tied up and unavailable for plants. Legume sod and manure are easily decomposed and are high in nitrogen. Their nitrogen is broken down to the nitrate form quite rapidly under favorable w e a t h e r conditions. Corn stalks, though, contain many carbonaceous compounds that resist decomposition. While gnawing at cornstalks, soil or-

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ganisms keep nitrogen tied up for a longer time.

You can see that available nitrogen is affected by many factors. Scientists have had a hard time developing a quick, practical laboratory test that would correlate with fertilizer tests in the field.

As opposed to this temperamental nitrogen situation, less than half the phosphorus and only a fraction of the potassium in the soil are contained in organic compounds. Their activity in the soil still is complicated but is affected by fewer variables. By studying thousands of experiments in the green house and in the field, researchers have been able to develop soil tests that correlate closely with the behavior of the mineral in the soil.

There is an estimated 12,000 miles of veins, arteries and capillaries in the human body.

A good silt loam contains from 2000 to 5000 pounds of organic nitrogen per acre. Sounds like a lot until you consider that the same soil contains only from 10 to 100 pounds of available nitrogen. An acre of corn producing 100 bushels of grain needs 150 pounds of nitrogen to do the job.

The conversion to available nitrogen goes like this: organic nitrogen is changed to ammonia by organisms called ammonifiers. Another family of organisms called nitrosomonas change the ammonia to nitrate. Only a trace of this is found in the soil because it is quickly converted to nitrate nitrogen, the available form, by a third group of bacteria called nitrobacter.

The Wisconsin nitrogen test involves a simple process of boiling a soil sample for five minutes in a solution of potassium permanganate and sodium carbonate. Ammonia is liberated. Nitrogen measured is called available nitrogen.

The assumption is made that the nitrogen liberated by this test tube reaction equals the liberation of nitrogen in the soil under favorable weather conditions. It also is assumed that this ammonia nitrogen under favorable conditions all would be converted to nitrate form in the soil.

The following table shows the levels of soil nitrogen based on pounds per acre found by test.

Pounds per acre available nitrogen found by test	Relative levels
0-75	Very Low
75-150	Low
150-225	Medium
225-300	High
300 plus	Very High

Wisconsin soil specialists base their nitrogen fertilizer recommendations on (1) the amount of soil nitrogen as indicated by the soil test, (2) the amount of

manure you intend to spread, (3) whether a legume sod is to be plowed down, and (4) the assumption that a starter fertilizer will be used. The soil class, sand, silt, clay, etc., also affects the rate of nitrogen application.

Starting with these recommendations, wise fertilizer use is up to you. By shopping around and doing a little figuring you can choose the cheapest form of nitrogen to apply. Base your calculations on price per pound of nitrogen.

More Ammonium Sulfate

During the first six months of 1958 in Illinois, farmers bought more ammonium sulfate (21¼ per cent N) than any other nitrogen source. Other nitrogen carriers in order of popularity were ammonium nitrate (33½ per cent N), anhydrous ammonia (82½ per cent N), and nitrogen solutions. Only small amounts of urea (45 per cent N) were sold because the price is high. Mixed fertilizers like 10-10-10 supplied over half the nitrogen used in Illinois. Nitrogen from all these sources is equally effective.

Anhydrous ammonia usually is applied commercially by persons with the necessary equipment. Apparatus for applying nitrogen solutions is inexpensive, or you can rig your own system on corn planter or cultivator. Your county agent or farm adviser can give you help with this.

You can plant check strips to test the economic soundness of your fertilizer program.

You should maintain plant populations of 16,000 to 18,000 per acre to make full use of fertilizer. If your legume sod has run out, you will need more nitrogen than if a vigorous stand is plowed under.

Keep the entire fertility picture in order. Plants need adequate lime, potassium, and phosphorus to utilize nitrogen.

U.S.D.A. Prescribes Humane Slaughter Methods

The Department of Agriculture has prescribed, under P.L. 85-765, three methods of humane slaughter of livestock: (1) *chemical* — use of carbon dioxide gas for sheep and swine; (2) *mechanical* — use of captive bolt stunners, or gunshot on sheep, swine, goats, calves, cattle, horses and mules; and (3) *electrical* — stunning of swine, sheep, calves and cattle with electric current. Packers offering meat products for sale to Federal agencies after July 1, 1960, must comply. Ritual requirements, however, are deemed by Humane Slaughter Law to comply with public policy and are exempt from the Act. —*Our Nation's Capitol*

Systemic Insecticides — A Promise For The Future

Scientists now make plants "poison" their own insect pests . . .

Condensed from New Jersey Agriculture

J. P. Reed, University of New Jersey

A "systemic insecticide" may be defined as a chemical that when applied to a plant is absorbed and translocated thruout the tissues, thus making it insecticidal or toxic to feeding insects.

Tests have proved that many of the materials used for insect control are absorbed by plants but only a few, to date, have been of value as true systemics. Selenium, for example, has been used for years on certain crops and more recently such toxicants as Systox and Thimet, which are in the organo-phosphate group of insecticides, have entered the field. At the present time, Systox can safely be used for the control of certain insects on twenty-four different crops that are consumed by man and animals, providing the regulations established for its application are strictly adhered to.

Need Careful Tests

Vegetables constitute a large per cent of the human diet, and the use of systemic toxicants on these crops presents a number of problems that must be carefully considered before recommendations are established. Extensive and carefully controlled tests are imperative in order to ascertain their possible toxic effects on man. This factor becomes doubly important since the systemics essentially become an integral part of the vegetable tissues and cannot be eliminated by washing procedures that are commonly used for many of our familiar insecticides.

It is also necessary to evaluate the effects of these chemicals on the growth and quality of the

Reprinted from New Jersey Agriculture, College of Agriculture and Experiment Station, Rutgers University, New Brunswick, New Jersey

treated plants. Tests conducted at the Rutgers farm have shown that some of these materials may either substantially reduce yields or retard growth to such an extent that the harvest date is considerably later than normal, and from the standpoint of quality, the size and palatability may be adversely affected. These factors varied with different vegetables and with the various chemicals tested. For example, Thimet had a much more detrimental effect on the growth of lima beans than on snap beans. This growth retardation effect using Thimet has also been observed on cabbage, broccoli and potato; while on tomatoes, an adverse effect on quality was noted.

Effective In Soil

The insecticidal efficiency of Thimet on certain insects, however, has been outstanding, when it was applied to the soil. On cabbage, for example, flea beetle control was excellent, while imported cabbage worm and looper damage was greatly curtailed. On potato, where the seed pieces were treated, flea beetle feeding was essentially nil and corn borer damage was reduced. On snap and lima beans, where both seed and soil treatments were used, the green clover worm was controlled up until harvest. Thimet applied to sweet corn seed greatly reduced European corn borer infestations but had no effect on the corn earworm. This same insecticide, on the other hand, when used as a foliage spray, showed little or no systemic action and gave only temporary control much in the order of the conventional toxicants commonly used on vegetables.

A systemic insecticide may be absorbed into a plant either through the roots and translocated throughout the tissues; through the leaves when applied as a spray and translocated; or absorbed and spread into only those leaves to which the material has been directly applied. The chemicals tested to date have shown the best systemic action when applied either to the soil or to the seed, where absorption takes place through the roots. It has also been found that certain materials which exhibit true systemic action when absorbed through the roots will have little or none of this property when applied to the foliage. Thus, the method of application, depending on the chemical used, will determine its systemic action.

20% of American farms produce 80% of food and fiber offered for sale.

Longevity Will Govern

The use of these systemics on

vegetable crops will also be governed by their toxic longevity. Will its action persist for the life of the plant; will it last for a matter of several weeks; or is its toxicity a transient thing, lasting for only a few days? Conversely, the maturing or harvesting date of a crop must be considered. A systemic that is safe to use on a long growing crop like potatoes may not be applicable to such crops as radish or scallions which have a much shorter growth period.

Many Advantages

Some of the disadvantages of using systemic insecticides on vegetables have been discussed above. A number of advantages can also be cited; (1) since the toxicant is within the plant, rains, irrigation practices and sunlight do not destroy its insecticidal efficiency; (2) with soil or seed treatments, immediate protection is given to seedlings and young plants which are often severely damaged by insects before conventional sprays or dusts can be applied; and (3) a single application of a systemic may be as effective as several applications of a non-systemic foliage treatment, especially on rapidly growing crops where in a short space of time large areas of new foliage become vulnerable to attack.

The development and use of these systemic insecticides is in its infancy. As new chemicals exhibiting these properties are derived and found to be satisfactory undoubtedly many of them will find a place in the vegetable insect control program and will either supplant or supplement the toxicants currently being used. It should be borne in mind, however, that although they may have certain properties which would make their use desirable, we should not consider them as panaceas or cure-alls. A systemic may not necessarily be effective against all the insect pests found on vegetable crops, so it will often be necessary to use other insecticides as well.

To date, none of these materials are recommended for use on vegetables in most states. Only when they have been proved safe, and can be used to advantage, will they be advocated.

Although 53 per cent more fires occurred on national forests in 1958 than in 1957, the acreage burned dropped 15 per cent, largely due to increased use of aircraft in fighting forest fires. There were 11,050 forest fires in 1958 on land protected by the U.S. Forest Service, compared with 7,195 in 1957, but the area burned dropped from 141,000 acres in 1957 to 120,000 acres in 1958. Over the past five years, the area burned averaged 244,125 acres.

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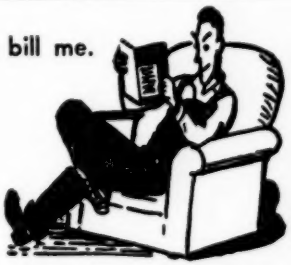
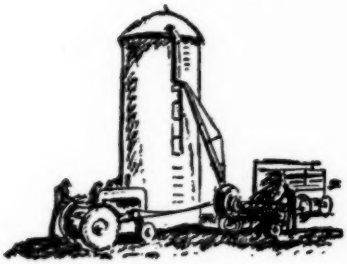


Here's a sketch of our farm where we publish Farmer's Digest. Our 200-acres are planted to corn, alfalfa, grass and trees. We farm — and we publish our magazine on a farm — because we believe that's the only way we can know what other farmers want to read. Farmer's Digest is probably the only farm magazine in the world published on the farm by farmers.

Latest Problems And Improvements With Grass Silage



A late and comprehensive report on the newest research concerning grass silage . . .

Condensed from
Guernsey Breeders' Journal

L. A. Moore,
Agricultural Research Service,
Beltsville, Maryland

DURING the past five-year period, increasing amounts of the Nation's hay crop has been harvested as grass silage. This shift is due to the desire of the farmer to overcome the weather hazards of hay making, and to the development of farm machinery for more rapid and efficient handling of silage.

Effectiveness of Various Methods of Harvesting

Extensive experiments were conducted at Beltsville on various methods of harvesting alfalfa as a feed for dairy cattle. The results collected over a five year period on the field losses, storage losses, and percentages preserved for feeding are shown in Table 1. These results showed that large losses of dry matter were incurred when the alfalfa crop was rain damaged. These losses are due to leaching and to leaf shatter in turning the hay in the windrow with a side delivery rake to aid in getting the crop sufficiently dry to store. The resulting hay was of poor quality and low in feeding value. The practical farmer knows that the entire crop can be lost where excessive rainfall occurs. The results also showed that barn drying, or making the crop into wilted silage, was the most efficient in terms of costs and of feed dry matter preserved. With these results as a background, further experiments were initiated into methods of preserving hay crops as grass silage.

Present Knowledge of Silage Making

Despite the importance of silage making in our agricultural economy, the research effort going into the problems associated with silage making is indeed

Reprinted by permission from Guernsey Breeders' Journal, Peterborough, New Hampshire

small compared to other agricultural problems.

Briefly, according to our present knowledge, we know that silage is made primarily by means of the fermentation of the carbohydrates in the plant material with the resulting production of certain organic acids such as butyric, lactic, formic and acetic acids. We know that exclusion of oxygen from the silage mass is important in the fermentation process. This important principle is sometimes not fully appreciated by the practical farmer. We know that silage can be made in different structures with differing success and varying losses. We know that the proper use of the wilting procedure or the use of different types of preservatives will usually produce a good silage. We have some knowledge of the feeding value of the grass silages.

With the development of modern machinery, new types of structures for storage and new preservatives, the scientist in my experience does not have the answers for those seeking information of the effects of these new developments on the silage making process because of the primary lack of fundamental information.

The Water Problem

Prior to the development of the direct-cut field forage chopper, a great deal of the grass silage was made by means of the wilting procedure. This consists of cutting the crop with a mower, permitting the crop to wilt from 1 to five hours until the moisture content is between 60 and 70 per cent, raking with a side delivery rake, chopping from the windrow into wagons or picking the crop up with a hayloader onto trucks, chopping and blowing into the silo. On the other hand, the direct-cut forage chopper cuts, chops and blows the crop directly into trucks or for-

Table 1. Per cent of alfalfa dry matter in field losses, storage losses, and preserved for feeding when harvested by various methods.

	Field losses	Storage losses	Preserved for feeding
	%	%	%
Field cured hay — rain damage	32.6	4.0	63.4
Field cured hay — no rain damage ...	17.4	3.6	79.0
Barn dried hay — no heat	12.6	6.4	81.0
Barn dried hay — heat	13.4	1.8	84.8
Wilted silage	5.8	11.0	83.2
Dehydrated hay	5.6	4.1	90.3

age wagons and thus does not permit the wilting of the crop in the field. This introduces a new set of problems.

To get 35 tons of dry matter in the silo, the farmer must handle 75 more tons of water if his crop contains 80 per cent moisture compared to the wilted crop containing 65 per cent moisture.

Besides the extra power required to handle the 75 tons of water, it also creates a seepage problem. When the crop contains 80 per cent moisture, one might expect that as much as 50 tons of water will seep from the tower silo carrying with it valuable nutrients since the seepage contains seven to eight per cent dry matter. In experiments at Beltsville, the total loss from the stored dry matter from a high moisture crop will be between eight and 15 per cent in the form of seepage. The effect of the moisture content of the crop on seepage dry matter losses is shown in Table 2.

Table 2. Estimated seepage dry matter losses from tower silos.

80% moisture	8-15%
75% moisture	5-8%
70% moisture	1-2%
65% moisture	1%

The seepage loss according to preliminary data at Beltsville will be about halved if the silage is stored in the horizontal type of silo such as the bunker silo. Furter data are needed on this point. Likewise, we need further data on the effect of type of crop, depth of storage and length of cut on seepage losses.

Table 3. Water uptake of 30 grams of feedstuffs following 5.0 lbs. pressure/sq. in.

	Water (grams)
Beet pulp	97
Beet pulp (ground)	91
Citrus pulp	63
Citrus pulp (ground)	63
Brewers' grain	46
Corn cobs	44
Corn cobs (ground)	64
Bran	10
Corn meal	9
Chopped hay	63
Ground hay	50

The addition of a feedstuff which has the ability to take up water has been helpful. However, it would require about 230 lbs. of beet pulp per ton of wet silage to bring the moisture equivalent from 80 per cent to 70 per cent. Such addition of beet pulp would result in the silage dry matter containing 36 per cent of beet pulp as it is stored. This raises the question whether the farmer has the silo for the purpose of storing beet pulp or forage.

In laboratory studies at Beltsville, the water holding capacity of several feedstuffs was studied as shown in Table 3. Citrus pulp, beet pulp and ground hay were best, dried distillers grains inter-

mediate, while ground cereal grains were poorest. The use of chemical preservatives does not reduce the seepage problem.

The Use of Preservatives in Making Grass Silage

Many different materials have been used to aid in the preservation of silage. These materials naturally divide themselves into two classes, namely, feedstuffs and chemical preservatives. Among the feedstuffs are such materials as molasses, ground grains, beet pulp and citrus pulp. These feedstuffs add nutrients to the silage with an attendant fermentation loss of about 15 per cent. The chemical preservatives have consisted of sulfur dioxide, sodium metabisulfite and a commercial preservative containing calcium formate and sodium nitrite.

The level of underground water in Los Angeles has dropped 200 feet in the past 15 years.

Since the development of the direct-cut forage chopper and the necessity for the preservation of high moisture crops, the use of preservatives has increased. Their effectiveness can vary from crop to crop and year to year. For instance, in research at Beltsville it was shown that a chemical preservative was of value one year, but of no value the following year with a similar crop. The effectiveness of the preservative was dependent upon the quality of the silage in the untreated control.

In 1953 the use of preservatives resulted in a silage lower in ammonia nitrogen, lower in butyric acid, higher in lactic acid, and with slightly more dry matter preserved than in the corresponding control silage. The following year, 1954, there were no differences between the untreated silage because the untreated silage was also good silage. The presence of butyric acid is evidence of excessive fermentation losses.

Because, at this time, we have no way of predicting the quality of silage which will result from no preservation treatment, we have been recommending their use with high moisture crops. A preservative should be no excuse for using poor ensiling methods. A preservative is not necessary and probably should not be used with wilted crops.

The Use of Plastic Covers on Bunker Silos

The development of plastic sheets or covers will be largely responsible for the continued use of horizontal storage. The plastic cover prevents water from rain or snow from penetrating the silage mass and permits the exclusion of air from the large

surface of horizontal silos. The usually large loss of 30 to 40 per cent or more of the dry matter attendant with poor packing or heavy rainfall in the uncovered horizontal silo can be reduced to 15 per cent. This loss is primarily due to fermentation and seepage, with little or no surface spoilage.

The relative effectiveness of the use of covers applied in various ways was tested. It was evident that the cover must be weighted with a material, like sawdust, over the entire surface. Weighting at the edges is not sufficient because air entering in one or two holes will expose the entire surface of the silage. The weighting material tends to confine the loss from a hole or puncture to a small area. The data show that in 1954, the spoilage loss amounted to 6-7 lbs. of dry matter per square foot, whereas by proper application of the cover the loss was reduced to 0.2 to 0.5 lbs. per square foot.

If forage dry matter were assigned a value of 1½ cents per pound (equivalent to 15 per cent moisture hay at $25.50 per ton) the plastic cover would be worth 10½ cents per square foot, plus the unknown value of gaseous loss, plus the value of reduced leaching by rain, plus the value of decreased labor of removal of spoilage. Thin plastic covers applied from 6-20 foot wide rolls can be obtained for two to three cents per square foot and replaced each year. It is believed that the same information would apply to trench silos.

Types of Silos

The tower silo has been the conventional type of structure used for storage of grass silage for many years. The gas-tight silo with the bottom unloader is an unique modification of the tower silo. However, during recent years, silos of the horizontal type such as trench and bunker types have come into prominence. The lower initial cost, and the possibilities of mechanized filling and feeding, or self-feeding of the silage, has attracted many farmers to the use of trench or bunker silos. Stacks have also been used for emergency or temporary storage of silage.

Some of our fondest dreams fail to materialize, and we can be thankful many of our nightmares don't come true either.

The effectiveness of the various structures in preservation of dry matter of grass silage is dependent to a considerable extent upon the techniques and management of the crop by the farmer at the time of ensiling. More care is necessary in making silage in the horizontal type silo than in the tower silo, because of the lack

of weight from the depth of silage as well as the greater surface area exposed. Because of these two factors, more difficulty is experienced in the exclusion of air from the silage mass. These two difficulties can be partially overcome by packing with a tractor during the filling process and by covering the surface of the silage with plastic covers held in place with some such material as sawdust.

One year's results on the comparative effectiveness of tower and bunker storage of silage show that the seepage loss (3.8 per cent) was less for the bunker silo than for similar silage stored in a tower silo (8.4 per cent.) This difference was largely responsible for more dry matter being preserved in the bunker silo (85.2 per cent) than for similar silage stored in the tower silo (77.9). Where the crop was wilted, the figure was 86.3 per cent.

Research shows that it is wise to add one or 2 pounds of grain daily per cow if changing cows from corn silage to grass silage. This balances digestible nutrient intake to the high protein in the grass silage.

These preliminary results indicate that for a wet crop, silage dry matter can be as well or better preserved in a bunker silo as in a tower silo. However, it should be pointed out that special care was taken with the bunker silo to be certain of adequate packing and covering the crop. Unless adequate precautions are taken, the loss can range from 40 to 100 per cent.

We have not recommended the storing of wilted silage in trench or bunker silos because of the difficulty of packing and excluding air. With the development of plastic covers to exclude air, the storage of wilted silage in these structures should be investigated because of the better acceptability of wilted silage by cattle.

It seems likely that horizontal storage of silage crops will continue to increase, providing the importance of packing and covering is fully understood. The advantages of lower initial cost per ton of silage stored, and possibilities of mechanization in harvesting and feeding will encourage farmers to use the method.

The question of the use of such structures in warm climates remains to be answered. The exposed silage removal surfaces may permit excessive losses. Perhaps these losses may be quite high in the summer months. The development of the top unloader, coupled with the possibility of mechanical feeding, will make the tower silo more attractive in the future.

The Acceptability of Grass Silage by Cattle

Another problem on which we need further information concerns the acceptability of grass silage by cattle. Information at Beltsville shows that where silage is the principal or sole forage being fed, the higher the moisture content of the silage the less total dry matter cattle will consume.

It is true that more pounds of wet silage will be consumed than of the dry type of silage, but because of the high moisture content of the wet silage, less total pounds of dry matter are actually eaten.

Data at Beltsville also show that dairy heifers will consume more total dry matter from alfalfa hay than from wilted silage, which results in more total digestible nutrients being consumed and greater growth compared to silage-fed heifers.

The decreased acceptability for silage is not due to water per se since the consumption of the dry matter is not increased by feeding dried silage. The addition of silage seepage to hay causes a decrease in dry matter consumption. Whether the decreased consumption of silage is due to decreased palatability, or to decreased appetite because of some metabolic disturbance in the animal, is not clear at this time. It is important that the cause of this effect be determined and work is now proceeding in this direction.

Where grain is fed at moderate levels, such as to a milking herd, the importance of the dry matter content of the silage to consumption is not entirely clear at this time. It appears from feeding trials where grass silage is fed, slightly less dry matter may be consumed as silage than hay, and milk production is not affected. Further information is needed to clear up this point.

Fundamental Studies at Beltsville

In experiments at Beltsville, three cuttings of alfalfa and three cuttings of orchard grass were harvested and placed in small one-ton capacity silos. Each cutting and crop was treated in five different ways in five different silos to exclude or include air in varying degrees. A total of 30 silos were involved.

The United States now has about 51 million head of beef cattle, which would fill a freight train about 22,675 miles long.

The results showed that alfalfa was more resistant to the insult of air inclusion than orchard grass. Likewise, the second crop was less resistant to the insult of air inclusion than the first crop for both the alfalfa and orchard grass. The third crop was in-

termediate. The results also showed that the type and quality of silage is determined in the first 24 to 48 hours.

The results further showed that the exclusion of air during the fermentation process and during the storage period of the silage in the silo is one of the most important factors the farmer should keep in mind. Any method or technique which will aid in air exclusion should be carefully practiced. Such factors as fine chopping, a tight silo with tight doors, and a proper top seal are important in the tower silo. In the bunker or trench silo, the silage should be continuously packed with a tractor and the surface sealed with some form of weighted plastic cover.

Wouldn't this be a grand world if all of us would let opportunity do the knocking?

Practical Implications

The use of silage in the forage program has been, and is being, challenged in some quarters because of the problems previously mentioned. It must be admitted that grass silage has certain limitations. However, we should recognize the limitations and fit its use into the forage program and thus still make use of its advantages.

At Beltsville, we have always recommended the feeding of some hay where grass silage is fed in order to maintain a high level of dry matter consumption. This system fits in with the practice of making the first crop of grass or legume forage into silage and, if possible, making the second or third crop into hay either by field curing or barn drying. This practice also fits into the weather pattern in most areas.

We have recommended about five lbs. of hay for a 1,000-lb. cow where wilted silage is fed. Where a direct-cut high moisture silage is fed, as much as 10 to 15 lbs. of hay should be fed or whatever the animal will consume. Of course, in any feeding situation the farmer should watch the condition of the cow and the rate of decline in milk production. If the decline exceeds eight to 10 per cent per month, the rate of grain feeding may need to be increased.

It is my belief that there will be a return to the practice of wilting the high moisture crops before ensiling in tower silos. We are not in position at this time to

Average per acre yield of lint cotton in North Carolina has only increased from 285 to 332 pounds in the last 30 years while yields of many of the basic crops have doubled.

recommend wilting for storage of the crop in trench or bunker silos. The advantages of direct chopping from a labor and machinery standpoint are not as great as originally thought. The disadvantages of seepage losses, poor quality silage, and poor acceptability by cattle of high moisture silage are difficult to overcome. Where good quality hay can be made without weather damage, it is the preferred feed. However, weather damaged poor quality hay is not a preferred feed.

Some Cows Don't Pay Their Way

Dairymen can't afford to milk cows producing 7,000 pounds of milk or less a year, warns G. A. Williams, Purdue dairy specialist.

A cow producing 7,000 pounds loses her owner $24 a year if all costs are considered, he says. Cows averaging 10,000 pounds return a net income of $77. So, if your cows produce around 8,000 pounds you are in the "danger zone between profit and loss," Williams asserts.

A study of more than 60,000 Indiana Dairy Herd Improvement Association records of the last three years supplies these comparisons:

Cows yielding less than 300 pounds butterfat averaged 163 pounds butterfat and 4,140 pounds of milk. Feed costs per cow totaled $115, leaving $51 to cover other costs, such as labor and depreciation. Cows in this group lost their owners $64 a year.

Cows producing between 300 and 400 pounds of butterfat averaged 353 pounds of butterfat and 8,797 pounds of milk. Feed costs per cow totaled $138 and $219 remained to cover other costs.

The average of all cows exceeding 400 pounds of butterfat was 632 pounds butterfat and 15,938 pounds of milk. Feed costs mounted to $176, but the remainder of the income reached the very satisfactory level of $510 a cow. —*Purdue University*

The small farm forest is pretty important in the timber industry. The Forest Service of the U.S. Department of Agriculture reports that 86 per cent of all private timber holdings are in plots smaller than 100 acres. These small forests make up about 121,000,000 acres, representing one-fourth of all commercial forest lands.

Chimney Smoke

by Irene Rudie

For every evil under the sun
There is a remedy, or there's none;
If there is one, try and find it;
If there is none, never mind it.

Put clippers in the hands of a 4-H boy for grooming his calf and the other animals are fair game; the farm dog may lose a band of fur around his middle, and the cats a strip down the back.

★ ★ ★

The great blue herons that live in the tamarack swamp commute endlessly between here and miles-distant lakes with food for their raucous young ones. No forty-hour week for them.

★ ★ ★

About the weakest resolution ever made on this farm is: We'll destroy the kittens as soon as they are born. Anyhow, the mother cat hides them until they're too cute to kill.

★ ★ ★

A sudden spring shower is the signal for Dad to pile the kids into the car and head for the nearest lake; then it's fish for supper.

A wise mother of daughters sometimes asks her son to help her with the dishes to create the opportunity to visit with him.

★ ★ ★

A certain much-advertised hair spray didn't live up to expectation in our house, but proved quite effective in removing stubborn lacquer from an old brass lamp.

★ ★ ★

People used to turn cows out of their stalls to make room for teams of horses when guests came. One of our neighbors sets her furniture out on the porch when the house is too full of people.

★ ★ ★

Some mothers can't bear to see good food go to waste. They eat the childrens' leftovers and it goes to waist anyhow.

★ ★ ★

Plant big sunflowers for little children. They can eat the seeds, or save them for next winter's birds.

Semen Test for Bulls

Breeding value of a bull is not determined by looks alone. To eliminate bulls who board but do not breed, use fertility tests . . .

Condensed from Texas Livestock Journal, originally published in Humble Farm Family

MANY Texas cattlemen, in an effort to increase calf crop percentages, are turning to *semen-testing* as an aid in determining breeding efficiency of their bulls.

Such a test, they say, gives immediate results which can — if properly interpreted and acted upon — s a v e cattlemen several thousand dollars normally lost in *low calf crops.* It also eliminates a big *board bill* for a bull that is inadequate for breeding purposes.

It would be hard to estimate the importance of such a program, if it gains widespread acceptance and meets the test of extensive usage. Like testing bulls for weight gaining ability, and t e s t i n g cows for pregnancy, semen-testing provides another method of cutting down risk for cattle producers.

How many bulls are boarders, but not breeders? Probably a lot more than most ranchers realize, if results of a recent survey conducted at Texas A&M College are an indication. Researchers traveled across the State of Texas, semen-testing bulls of almost all types and ages, and during different months of the year. In all, complete results were obtained on 1,369 bulls from 160 ranches.

They found:

Good bulls: 84 per cent.

Questionable bulls: 9 per cent.

Cull bulls: 7 per cent.

If this test can be considered representative, then *about 16 per cent of the bulls in Texas are of little or questionable value,* and perhaps ought to be eliminated from the herds.

Fertility testing is not a new idea. Every cattleman who takes his business seriously makes an effort to keep tab on effectiveness of his bulls. He knows their background, watches them perform at breeding time and observes their offspring. Over a period of time, he culls the ineffectives. This

Reprinted by permission from Texas Livestock Journal, P.O. Box 1469, San Antonio, Texas

may be as easy for a wise cattleman as the semen test, but it is also much slower.

Semen-testing, as the name implies, involves taking semen from a bull and checking it under microscope to determine its quality. There are several methods of collecting semen, but most popular now is the *electro-ejaculator.* It has advantages over some other methods in that it can be used without the cooperation of a bull.

To collect semen, a farmer or rancher must put his bull in a chute so he cannot move about and possibly injure himself. The collection might coincide with the annual routine check many cattlemen make of their bulls, and therefore would require little extra handling. Testing and evaluating a bull usually takes from six to 10 minutes.

Many a gal confines her exercises to jumping at conclusions, running up expenses, stretching the truth and bending over the keyhole.

The electro-ejaculator consists of a transformer and a rectal electrode. Through manipulation of the dials on the machine, an impulse passes through the walls of a bull's rectum and certain nerves are stimulated in his reproductive tract. This causes him to first pass a watery secretion and then a milky-colored secretion consisting of sperm and accessory fluid. A collection of sperm can be made in a funnel-topped test tube. Determination of what constitutes a satisfactory sample is left to the operator.

After semen is collected, a cattleman or a veterinarian can evaluate it on the basis of how it meets four requirements:

Color and Consistency: Quality sperm should be a milky to creamy type fluid, not clear and watery. This can be determined either by naked eye or under microscope.

Motility: About 60 to 80 per cent of the cells should be moving in good quality serum. This can be determined only under microscope.

Rate of Movement: Sperm move much like tadpoles in that there is a beating of tails as they move across the microscope slide. A rapid rate of movement is desirable.

Abnormal Sperm: Abnormal sperm may have small heads, large heads, coiled tails, crooked tails, double heads. Too many abnormal sperm cut down probabilities of conception.

The next step in the evaluation process is to rate each sample to determine how it meets the four requirements listed above.

1. Semen with good density, from 50 to 80 per cent movement, rapid movement, and less

than 15 per cent abnormalties is classified as *Satisfactory* semen.

2. Semen which has fair density, about 30 to 50 per cent motility, medium movement, and less than 20 per cent abnormalties is classified as *Questionable* semen.

3. Semen that is watery, has little movement, and has a high percentage of dead and abnormal sperm should be rated *Cull* or *Unsatisfactory.*

In some cases, a sample will score satisfactory on one or more of the requirements, but will fall short in others. To be rated satisfactory, a sample must be adequate in all four requirements. If low in only one requirement, sperm should be rated questionable. If low in two or more requirements, it should be rated unsatisfactory.

Cattlemen say bulls which rate satisfactory in the semen tests will ordinarily settle most cows in a herd, and therefore can be kept with reasonable assurance of good fertility.

Bulls which make a questionable rating, however, will settle only one-fourth to one-half of the cows with which they are mated. They should be either culled immediately or retested again if they are considered outstanding animals. Any "prize" bull that falls into the questionable category should be retested immediately to make sure a representative sample was obtained. Even a third or fourth test can be made, although a bull should be allowed a few minutes in between to regain his composure. Some cattlemen like to wait about a month before making a final culling of their animals. This gives time for another sampling. Also, during this period it might be possible for a veterinarian to determine the cause of low fertility, and correct it.

In rechecks made during the Texas A&M tests, only one of 30 bulls which were originally marked cull or questionable was found to be satisfactory on rechecks.

Never put off until tomorrow what you can do today. There may be a law against it by that time.

Equipment needed for fertility testing of bulls is available for any farmer or rancher who wants to buy such equipment. Except for the big operators, however, the practical idea may be for veterinarians to make the tests. Some vets already have the necessary equipment, and many of them have attended short courses to learn how to operate electro-ejaculators. Some ranchers have worked out a cooperative arrangement so they can have tests made at the same

time and save considerable expense.

The Texas A&M scientists in their testing of more than 1300 bulls, turned up some pretty interesting facts. For one thing, their survey indicates there is little relationship between age of bulls and fertility. In general, they found older bulls to be about as fertile as younger ones. Culling through the years probably accounts for this.

It is thought that young bulls can be tested by the time they are 18 months old, perhaps even at 14 months. All young bulls do not reach sexual maturity at the same time so no definite age limit can be set.

The payoff to cattle producers from sperm-testing comes primarily with increased calf crops and fewer non-paying bull "boarders.". As one cattleman pointed out, culls eat just as much grass and cottonseed cake and drink just as much water as good bulls. And in many cases they represent as much investment. Also, they may keep better bulls away from the cows. In the case of small operators, who may have only one bull, use of a cull may cost him an entire calf crop, or at least delay it for several months.

Testing Crab Grass Control Agent

Dow Chemical is testing a new pre-emergence herbicide which may prove effective for control of weeds in farm crops and crab grass in turf. Applied prior to the crab grass season, the compound promises to prevent growth of the weed. The new material also shows promise for control of other turf weeds such as muhlenbergia and chickweed, according to Dow spokesmen.

In addition to meeting turf weed problems, the new compound also promises to be useful as a pre-emergence or early post-emergence weed killer in crops such as soybeans, cotton, corn, snapbeans, peanuts, and peas.

The compound is undergoing further research trials to prove its utility. As yet there are no stocks available for sale or general sampling. For that matter, the compound does not yet have a name. The material will be given further laboratory and field testing this coming year and will be sampled to public research agencies for further testing.

What About Bloodspots?

Poultry breeders are working to reduce this problem in the Nation's laying flocks. Here are some answers . . .

Condensed from American Poultry Journal

Kirby McDowell

OVER the years, bloodspots of eggs have not only caused economic loss to the poultryman but have been a deterrent to increasing egg consumption. The bloodspot problem has been with us for some time and has had some thorough investigation. Although still with us, it certainly is less of a problem than some twenty-odd years ago. Here are some of the causes of bloodspots.

It is a fairly well accepted fact that they are the result of a hemorrhage that occurs in the follicle of the hen's ovary. This is thought to happen sometime before the ovulation process begins. A blood vessel probably ruptures and drains during yolk development. However, this evidently is not the only point where this problem occurs, as some bloodspots are thought to develop during the ovulation process.

The amount of blood deposited may be barely seen, or it can be quite large. In most cases, it is found on the yolk of the egg. Here, the spots are blood red, while occasionally, some of the lighter hue are found on the albumen.

Meat spots are more common than bloodspots and fortunately are less objectionable to the public. These small particles are actually the degeneration of bloodspots. The change-over from blood to meat spots might be considered quite rapid, since it occurs within 3 to 5 days.

What Causes It?

There are many theories on the whys and wherefores of bloodspotting. Some of these have scientific proof, while others are purely speculative. The most common beliefs (proven and otherwise) are as follows: inheritance, production, season, breed, housing, feed, and injury.

Today's poultry breeders have been successful in controlling the bloodspotting tendency through scientific breeding methods. Much impetus has been given to this work the last several years following the advent of the breakout procedure for testing interior

Reprinted by permission from American Poultry Journal, 180 N. Wabash, Chicago 1, Illinois

quality of eggs.

The Univ. of California showed the strong part inheritance plays in the problem when it actually established a 'bloodspot line' of White Leghorns. In doing this, Doctors Michael Lerer and Lewis Taylor increased bloodspotting 23% within several years by actually selecting for this trait.

They computed that bloodspotting had a heritability of about 50% These researchers expanded their work further by crossing the bloodspot line with the original parental line and found that trait to be intermediate in the offspring of the cross. A look at results from egg laying tests further points out the importance of inheritance and its affect on this problem.

The 3-year average in California (of individual strains) has a percentage of bloodspots running from 2.49% to 10.12%. A progress report of the current test shows a variation of .94% to 14.88% with an average of all entrants of 5.52%.

Production Level and Season Are Factors

A heavy rate of lay produces an above normal amount of bloodspots. Young pullets at their peak of lay will produce more spots. This is one of the disadvantages, admittedly minor, of the all pullet flock. Over 10 years ago, an experiment conducted in the east showed that about 44% of all hens laid some blood spot eggs their first year, 26% the second year and 22% the third. Age and the rate of lay are, of course, closely correlated, since production drops almost 20% each year. As the flock grows older, most individuals will produce less bloodspots, while a few hens will actually drop more.

There is more argument as to whether the spring months find flocks laying more bloodspot eggs than in the winter season. Some experiments have shown the spotting to be most prevalent in the winter and into early spring. The 'over stimulation theory' can help to explain the spring phenomena, but it is difficult to understand the incidence in the winter months. Reports from eastern stations indicate that the problem is greater in the colder areas, during winter, than in the South or California.

"One illusion is that the present hour is not the decisive hour. Write it down on your heart that every day is the best day of the year." —Emerson

At one time, it was believed that the heavier breeds of chickens were more prone to this disorder than Leghorns. This, however, has been largely refuted by results of current egg laying tests. An example of this is found with

the R. I. Red that at one time was felt to be the breed most inclined toward this tendency. Current trials are showing several strains of Reds to have much less blood-spotting than many Leghorn strains.

Crossing Lessens Blood Spots

Strain crosses, breed crosses, and inbred crosses are averaging less of the clots than purebreds. Possibly this is another expression of heterosis or hybrid vigor that is found in cross-breeding. In any event, here is a consistent trend. An example of this is shown in the following figures taken from the Final Report of the Eighth California Official Random Example Test:

	Bloodspots
Average Leghorns	9.56%
Average Crosses	5.90%
Average Inbred Crosses .	7.88%
Test Average	7.78%

The one theory that has caused the greatest amount of speculation lately is that concerning floor type houses versus wire cages. In the California tests, blood spotting was greatest in caged birds. One of the more popular theories of why this occurs is that of 'hidden nutrients' the hens may be consuming from the litter.

Another explanation deals with the fact that the caged hens get absolutely no exercise. A third idea bears down on the temperature factor, since the caged layer is exposed more readily to high and low thermometer readings.

"Grass Juice" May Help

There is no plausible basis for laying the blame of bloodspotting to feeding practices. Vitamins A, C, D, E and K have been administered in various dosages but failed to curb the tendency. The idea of high protein or calorie levels causing the problem seems to have disappeared. There is, however, one interesting theory that was first heard when wire housing came into popular practice. This is that hens on range will lay few bloodspots. We realize this is not practicable for today's modern producers. Nevertheless, it is interesting and may be tied in with the 'grass juice' factor of poultry nutrition.

Another theory that can be refuted is that of flocks of a flighty nature lay more bloodspots. The idea here is that a flock of floor birds might "spook" causing injury and consequently more spotting. Researchers have attempted to induce the "spots" by scaring flocks of chickens, but it just didn't work.

In summarizing, it is quite apparent that poultry breeders are doing much to reduce this problem in the Nation's laying flocks. Whether the type of housing is the second answer to the problem is difficult to say. It certainly merits serious consideration after seeing recent laying test reports.

Foot-Rot In Cattle

You can help prevent this costly infection . . .

Condensed from The Agricultural Gazette of New South Wales

FOOT-rot occurs as a result of an organism gaining entry to the tissue of the foot, where it multiplies and causes extensive damage. It usually occurs in the winter when lanes and yards are muddy and boggy, or where cattle are run on wet, swampy country. This continued moisture softens the hoof and also allows overgrowth of the feet, providing crevices in which the organism may multiply.

Foot-rot is also seen in rough or stony country where the hooves become bruised, as it would appear that the predisposing cause is injury to the hooves or surrounding tissues which occurs most readily when these are softened by continual moisture.

The organism responsible can apparently live for months in the soil when this is wet and heavily contaminated with manure. It is when cattle are run in this type of environment that spread from beast to beast occurs most readily.

Symptoms

Usually the first symptom is noticed lameness—often very severe. Occasionally more than one foot is affected and the animal then moves only with extreme difficulty. The affected foot is extremely painful, and usually hot and swollen. This swelling is particularly noticeable around the coronet and between the claws. Because of the pain, affected cattle are unable to walk any distance and often lie down. As the disease progresses, the swelling will break, usually just above the hoof, or between the claws, or at the heel. When the swelling breaks it is often noticed that the pain is much relieved.

Accompanying the lameness there is usually a high fever, causing a loss of appetite and a drop in milk production. This drop in milk production is accentuated by the pain of the disease which causes a further loss of production and condition.

If the condition is allowed to progress, deeper tissues become affected and the swelling may extend above the fetlock. Such neglected cases usually result in malformation of the foot and permanent lameness.

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Treatment

If treatment is to be successful it must be commenced early. If cattle are treated when lameness is first noticed, the condition will usually clear up rapidly, but if left until a later stage, treatment is not nearly so satisfactory and a long recovery period is the rule.

In present-day treatment the substance most usually used is a 33-1/3% solution of sulphadimidine. From 75 to 150 c.c.'s of this substance are given by injection under the skin. The site does not matter, but it may be found convenient to inject the material just behind the shoulder. As this is a large quantity of material to inject at one site, it may be found desirable to divide the amount and place half on each side of the animal. Where treatment with sulphadimidine is commenced early a single injection will usually produce a cure within twenty-four hours, but sometimes the treatment must be repeated. Syringes used in making this injection should be sterilized by placing the syringes and needles in cold water in a saucepan with a lid and bringing to the boil. The water should be kept boiling for twenty minutes and allowed to cool, taking care not to remove the lid until the syringe is to be used. The water should be drained off and the syringe handled so that only the outside of the barrel of the syringe and the handle of the plunger is touched with the fingers. By this means the inside of the syringe will be sterilized and infection will not be introduced when the solution is injected.

To make the injection, the skin at the site of injection should be cleaned by swabbing with methylated spirits and allowed to dry before the needle is inserted, the skin near the edge of the clean area is grasped and pulled away from the body, thus forming a "tent." The needle should be attached to the syringe and inserted through the clean area of skin at the base of the 'tent" parallel to the body to avoid damage to the muscles.

If the larger injection is made in the one spot, the solution should be warmed to body heat before injecting, and after the injection has been completed should be massaged gently over a wide area in order to avoid abcess formation.

In advanced cases, treatment with sulphadimidine will probably not be effective. In these cases, it will be necessary to resort to local treatment. Firstly, the animal should be kept in a clean, dry yard or stall. The affected foot must then be thoroughly washed in a warm antiseptic solution made from any of the common and readily available antiseptic solutions. During

this washing the solution should be changed as soon as it becomes dirty and a fresh solution applied. It should be continued for periods of at least half an hour at a time for two or three times a day.

Prevention

If it is remembered that infection is picked up from the soil, with moisture and foot injuries the predisposing causes of infection, something can be done to prevent the condition. Every effort should be made to keep those areas where cattle regularly congregate as dry as possible. It may sometimes be possible to smooth rocky paths or tracks over which cattle regularly move.

Hitch Implements to Tractor Drawbar

Always hitch trailing implements to your tractor drawbar to prevent the machine from tipping backward.

Any farmer who ignores this advice may not get a chance to correct his error, says O. L. Hogsett, extension safety specialist. When a tractor tips backward, it often crushes the driver or pins him down. Spilled fuel catching on fire is an additional danger.

Modern tractors are designed so that they'll stall or lose traction before they will tip backward when implements are hitched to the drawbar. But that safety feature does not apply when equipment is hitched to the axle, around the power lift or at any point above the drawbar.

An improper hitch may not cause the tractor to tip backward until you get into a tough pull or head up hill. When a tractor tips, things happen so fast that the driver seldom has a chance to reach the clutch or to jump. —*University of Illinois*

After a year of marriage, the wife left her husband and flew back to mother. No sooner had she arrived at the old homestead than the complaints started pouring out. "Mother," she wailed, "that man's impossible. For the last four months I couldn't discover where he spent his evenings."

"That's terrible, dear. Did you ever find out?"

"Yes," sobbed the daughter. "One evening I went home, and there he was."

Durable Concrete, Favorite Building Material

With development of more modern techniques, new jobs have been found for concrete in precasting and tilt-up construction . . .

Condensed from Missouri Ruralist

Cordell Tindall

CONCRETE always has been a favorite building material for farm construction, chiefly because of its durability. Today, with new techniques, new jobs have been found for concrete in building on the farm. Prominent among these techniques are precasting and "tilt-up" construction.

E. M. Stites, Dexter, Missouri, is adapting these 2 practices to a system of building in which panels are precast at his ready-mix concrete plant, hauled to the farm, and erected. Panels on buildings are held in place by columns or pilasters cast "on the site." He also precasts sections for silos and grain storage bins.

A tilt-up technique was used in erecting the new Missouri Swine Evaluation Station at Columbia. Here, wall sections were cast on the job, erected with a farm tractor.

The Texas Agricultural Experiment Station has been doing research on tilt-up construction for farm buildings, and plans from other state agricultural colleges have been adapted to this technique.

Mr. Stites, who not only is a buildings material supplier, but also a construction engineer, has developed a business in farm buildings that is unique in Missouri. He also builds other structures such as garages, warehouses, gin buildings, Vocational Agricultural shops and similar structures with precast concrete panels.

It is Mr. Stite's studied opinion that there is much in favor of precasting panels at his plant rather than doing the job on the site. He points out control of quality of concrete is much better.

Also, where standard-size pan-

Reprinted by permission from Missouri Ruralist, Fayette, Missouri

els are used he has developed improved techniques for casting duplicate panels, one on top of another. The precast panels are moved to the building site with an "A" frame on a "low boy" trailer, and put in place with 2 mobile cranes designed especially for this work.

As Mr. Stites points out, transportation of the panels is no problem, does not increase the cost, as all building materials must be transported to the site anyway. He thinks it's cheaper to haul the materials in the condensed panels.

Altho he uses on-the-site columns to hold the panels together, he has standard forms for this job, and they are used over and over. Thus, cost of forming columns for each job is small. The columns not only tie the panels together in place, the columns also are bonded to the footing pads.

Here's the technique used: First, square footing pads are poured. They extend below the frost line; their width and size vary according to size of buildings and soil structure. Panels are cut in his shop, then hauled to the site and put in place with the cranes. Panels sit on the pads. A space of about 6 inches is left between panels. Ends of the panels have "V" slots so the columns are "keyed" into the panels. Also, reinforcing rods extend from the panels and also from the footing pads so the poured column ties the building together. In some instances, a "shiplap" is used with the panels.

The resulting concrete structure is a sturdy one. Buildings erected in this manner show no signs of cracking in several years. There are tiny expansion joints in the walls but for the most part these cracks are controlled. Such buildings are resistant to strong winds and there is little maintenance. Covered with concrete paint, the structures present a pleasing appearance.

Roofing panels are being cast, too, for fireproof reasons. Similar panels can be used for a floor in 2-story buildings. A milkhouse at the Schuchart Dairy Farms, Inc., Sikeston, Missouri, is a 2-story building. The second floor is for overhead feed.

The wall panels, with reinforcing steel in them, are built like beams, Mr. Stites points out. Thus they can carry heavy weight.

Various types of farm structures are being erected by Mr. Stites. The 2-story milk parlor has been mentioned. On the Shelby Crowe farm, near Dexter, a 1-story milkhouse was erected several years ago, and Mr. Crowe added a wooden feed room overhead.

Not yet completed is a central farrowing house, to be built with

the same technique.

Plan Low-Cost Farm Homes

Under construction are low-cost farm homes, erected on plantations for farm employees. These houses, with flat roofs, lightweight concrete walls and partitions, can be built for a little more than $5,000.

This technique can be used for almost any type of farm buildings. Wall panels can be made any size, but usually they are 8 or 10 feet high and 10 feet long. Some have been made in 12-foot heights. Thickness is 5 inches. Doors and windows can be cast into panels where desired.

Mr. Stites also is erecting both upright and horizontal silos. The horizontal ones are made with panels similar to wall panels, and the pilasters are cast in place on the job.

One of the obvious advantages of this type of construction is speed. If standard sections are used, buildings can be put up in quick order, providing a supply of sections is on hand. If sections are cast on order, time required is similar to that required in standard building techniques.

Use a Spray Gun

Another new technique used by Mr. Stites with concrete is application of "gunite" concrete, made of sand and cement that can be sprayed on a surface with a spray gun. At the Schuchart farm, for example, a pole-type loafing shed was erected, and a concrete siding was applied using this technique. Metal mesh, with a paper backing, is nailed in place on the walls and from 1½ to 2 inches of concrete sprayed on. This siding has taken rough use at the farm and shows no signs of cracking or chipping.

This "spray gun" concrete also is used in columns and corners of smaller buildings to tie wall panels together, presenting a smooth surface to the completed building.

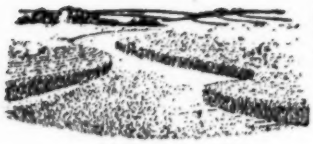
Texas A. and M. Studies Cost

Cost studies by Texas A. and M. College indicate that an open-front animal shelter built with the tilt-up technique cost $1.24 a square foot (20 feet wide). Grain storage costs were low for tilt-up, 26 cents a bushel.

In building the Missouri Swine Evaluation Station at Columbia last summer the same type tilt-up technique was used. Panels were smaller for hog houses. Here, regular farm tractors were used in erecting the walls.

Ralph Ricketts, Extension agricultural engineer who designed the houses, used polyethylene sheets on the casting slab. This gave a slick surface to one side of wall panels. This is a desirable quality where walls need to be cleaned. Dairymen with concrete wall milkhouses report they like the feature of easy cleaning.

Stripcropping for Wind Erosion Control



Cropping practices do not have to be changed to save your soil by this method.

Condensed from Soil Conservation

W. S. Chepil,
Agricultural Research Service

STRIPCROPPING, wind stripping, or strip farming, as it is variously called in different regions, is used to control wind erosion, especially in crop-fallow sequences in the Northern and Central Great Plains. It is a practice that does not require any change in cropping practices. It merely involves subdividing the farm into alternate strips of erosion-resistant and erosion-susceptible cropping practices. If the cropping practices on the farm are equally resistant or susceptible to wind erosion, there is no need for stripcropping.

Stripcropping is especially adaptable in dry regions where fallowing is done every second or third year. In the northern dry regions the summer-fallowed land is not seeded until the following spring. Thus, it is left bare during the windy season except for what crop residue may remain on the surface from a crop grown almost 2 years previously. To protect it from wind erosion, strips of standing stubble alternating with strips of fallow are virtually imperative on many soils. In the southern dry regions the problem is less acute because wheat on fallow is sown in the fall and if germination and growth conditions are favorable, a good protective cover against next spring's winds is usually obtained.

The purpose of stripcropping for wind erosion control is to provide barriers or trap-strips to check the spread of soil movement if and when it starts. The most common barrier strips are standing wheat or sorghum stubble. The stubble should not be disturbed by tillage or pasturing until the danger of blowing is over. Wheat stubble is generally more effective than sorghum stubble, and standing stubble more effective than flattened stubble for trapping blown soil. The stubble should be left as thick and as tall as possible.

How effective is stripcropping

Reprinted from Soil Conservation, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C.

for wind erosion control? The answer to this question is based largely on how effective the system is in preventing the rate of soil movement from exceeding a certain tolerable limit. Measurements of velocities and directions show that soil blowing is zero at the windward edge of a field or strip and increases with distance downwind until it reaches a maximum. The maximum rate of flow is remarkably uniform for all soils. For a 40 m.p.h. wind velocity, it is equal to about 2 tons per rod width per hour.

The more erodible the soil, the greater is the rate of increase in soil flow along the direction of wind and the shorter the distance in which the possible maximum soil flow is reached. Soil erodibility and therefore the rate of increase in soil flow are influenced greatly by soil textural class. The intermediate-textured soils, such as loams, are generally least erodible and the rate of increase in soil flow is more gradual than on sandy soils or some clays. Therefore, to be equally effective, strips on sandy soils and on some clays have to be narrower than on intermediate-textured soils. Based on average results, widths of erosion-susceptible strips necessary to keep the rate of soil flow from exceeding .2 ton per rod width per hour should be as follows:

Soil Class	Width of Strips
Sand	1.2 rods
Loamy sand	1.6 rods
Sandy loam	6 rods
Loam	15 rods
Silt loam	17 rods
Clay loam	21 rods
Silty clay loam	26 rods
Silty clay	9 rods
Clay (subject to granulation)	5 rods

The above widths are applicable for strips protected by 1-foot high stubble on the windward side and running at right angles to the wind of a velocity of 40 miles per hour. The widths should be adjusted one way or the other to fit the width of tillage machinery and to divide equally into the whole area to be stripped.

The actual width of strips required is influenced by several major factors. Apart from soil textural class, the general level of wind velocity plays a major part. The higher the likely wind velocity, the narrower the strips should be for equal effectiveness. Also, the effectiveness of the strips decreases as the wind deviates from right angles to the strips.

Still another factor is the width of the barrier strips and the height and thickness of stub-

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One issue of a popular magazine recently had 414 pages — 308 of which were ads.

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ble or other plant material in the barrier strips. The primary purpose of the barrier strips is to trap the soil that blows off the erosion-susceptible strips. There is some sheltering afforded by the barrier strips, but measurements have shown that for all but the most erodible soils the distance sheltered by standing stubble is small compared to the distance required for soil flow to reach the maximum rate.

For example, complete protection afforded by 1-foot high wheat stubble extends from 5 to 20 feet along the direction of the wind; but, the distance required for soil flow to reach a maximum rate ranges from about 100 to 10,000 feet, depending on wind velocity and soil erodibility. In other words, the increase in soil flow is not primarily due to reduction in sheltering afforded by the barrier strips. It is due mainly to a phenomenon known as soil avalanching, which is much like snow gathering volume and momentum as it rolls down a mountain.

The barrier strips need to be only wide and receptive enough to trap all the soil, except fine dust, that moves into them. For standing wheat stubble, a 30- to 50-foot width is usually sufficient. However, the erosion-resistant strips are usually rotated each year with erosion-susceptible strips so that both are normally made equal in width. The width of erosion-resistant strips in such cases is usually far greater than that required to trap all soil that may be moved into them.

The width of strips depends, too, on the rate of soil movement that may be considered tolerable. This in turn, depends on how much reduction in erosion is desired. The greater the desired reduction, the narrower the strips should be. The rate of .2 ton per rod width per hour may be considered tolerable. It is not a negligible rate. It is the rate that should occur on the leeward side of strips under a

A feed store is the only place in town where you can get a chicken dinner for 10 cents.

40-m.p.h. wind velocity without supplementary practices of erosion control. Supplementary practices that maintain crop residues above the surface of the ground and increase surface roughness and soil cloddiness would normally reduce erosion to a negligible rate. If, in unusually dry years, crops fail and insufficient crop residues, surface roughness, and soil cloddiness are available for needed protection, the maximum rate of erosion in a stripcropping system should be only .2 ton per rod width per hour — about one-tenth of the

possible maximum rate of soil erosion.

The tolerable rate of soil flow is associated with the degree of risk the farmer is willing to take. He has to accept the width of strips that would fail occasionally because the width that would reduce erosion to a negligible degree without the presence of sufficient amounts of crop residue, surface roughness, and soil cloddiness would be too narrow to be practical for most soils.

Stripcropping at best may reduce the intensity of wind erosion, but not stop it. Alone it has never been sufficient, but merely an aid, in reducing erosion, and especially in preventing soil blowing from spreading to other farms and communities.

Some special precautions must be taken in stripcropping systems. The tendency of soil to ridge on the windward edge of the stubble strips is one objectionable feature. To overcome this tendency the edges of the stubble strips may be disked so the blown soil would be spread over the stubble instead of ridging on the edge. Under extremely erosive conditions, strips may be shifted slightly to one side each year.

Another problem may be weeds growing on the edges of strips. These can be controlled by seeding grain 2 or 3 feet over into the next strip. As the next strip is cultivated later in the season, the cultivator can be extended into the seeded strip, thus killing the weeds that may grow along the edge.

Still another difficulty of stripcropping has been grasshopper and other insect infestations along the edges of wheat adjoining the sorghum or wheat stubble strips. With the advent of modern insecticides and modern spraying techniques, this problem usually can be overcome readily. Information on the use of modern insecticides can be obtained from various entomological institutions.

Some inconveniences of stripcropping are time lost in moving equipment from one strip to another, roads required along headlands to work strips, impossibility

Our word 'alfalfa' is derived from an Arabic word meaning 'beast feed.'

Dry cows and young stock should have access to a mixture of 100 pounds of trace mineralized salt and steamed bone meal if they do not receive a daily grain allowance supplying this mixture, say Purdue University dairy scientists.

of cross-cultivation, and inconvenience of pasturing sorghum strips in the fall and the alternating wheat strips in the spring. Where extremely large tillage and planting equipment is used, farmers seldom like to practice stripcropping; but, with ordinary equipment there is little complaint.

Under severe conditions of wind erosion many farmers who have adopted the system are convinced that the advantages of stripcropping far outweigh the disadvantages, provided, of course, supplementary practices that must go with stripcropping are adopted, too.

Tranquilizers May Have Use In Times of Stress with Stock

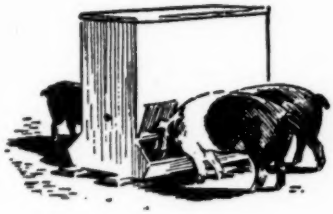
Tranquilizers, which have caused considerable flurry in the medical world, may have uses for livestock as well as for humans.

Animal husbandmen say that in 31 feeding trials with beef cattle, the use of several tranquilizers at various levels gave average gains 9% greater and feed efficiency 7% greater than where the tranquilizers were not used.

The main possibilities for use of tranquilizers is in periods of stress — during shipping, weaning, or drastic changes in routine. Tranquilization for shipping to market holds great promise. In feeding trials, the greatest benefits resulted under conditions of poor management which are known to cause stress, such as over-crowding, inadequate protection from the weather, and periods of starvation.

In a series of three trials at the Minnesota Agricultural Experiment Station it was found that, on the average, the feeding of low levels of tranquilizers to fattening lambs did not increase rate of gain. Therefore, low-level feeding of tranquilizers to sheep is not recommended. —*Virginia Polytechnic Institute*

Seven Steps To Success With Hogs



Follow this Englishman's guide to higher hog profits . . .

Condensed from Pig Farming

H. G. Boughton and *H. P. Insall*

THESE are the seven steps to success in a modern hog raising enterprise:

1. Aim for Regular Output

One often finds that the general farmer, as distinct from the specialist pig-keeper, tends to increase the size of his herd when pig prices are high. This policy often results in his having large numbers to sell when prices drop.

A regular output, even if on a small scale, would, over a period of time, produce a satisfying return and eliminate the nightmare of buying on a seller's and selling on a buyer's market.

The man who is constantly in and out of pigs will always find that his stock depreciation is high, as he will be buying dear and selling cheap. Conversely, the regular producer will find that the price for his fat sows is often as high as the cost for replacements.

2. Select Stock with Care

The basic aim in keeping a herd of sows is that they shall convert food into piglets and milk to nourish them. The whole success of the enterprise depends on the sow's ability to do these two things, and do them well under certain conditions of management.

When contemplating setting up a herd, therefore, the farmer should first ask himself: "What sort of finished article do I want to produce?" and secondly: "What system of management shall I use?"

When the most suitable breed has been selected the even more difficult choice of strain lies ahead. As many herds as possible should be visited, records examined, standards of management weighed up, and successes in carcass competitions, progeny testing, and even the show ring taken into consideration.

Often, more can be learned from assessing the character of the owner and his herdsman than

Reprinted by permission from Pig Farming, Lloyds Chambers, Ipswich, Suffolk, England

from a prolonged examination of the pig it is proposed to buy. The man has yet to be born who can state that a particular gilt will farrow 72 pigs in six litters and rear 60 of them to an average eight-week weight of 45 lbs., eventually to high grade at 25 weeks. However, pigs from some herds are more likely to achieve this than those from others, and

A small town is a place where you don't need to explain that black eye . . . everybody already knows.

that is the reason why a study of the man, his methods and his achievements is likely to pay handsome dividends.

Having bought what you consider good stock, do not be unduly disappointed if some of it fails to come up to expectations. If this happens, cull ruthlessly, and gradually your stock will improve, although the perfect pig will never be produced.

3. Feed Efficiently

There are two ways of purchasing pig food. You can either buy rations already compounded, or feeds to be mixed on the farm. The first method may have much to commend it in terms of simplicity and it will probably be a first-class ration, but it may be more expensive than the second method. Mixing one's own rations can be more economical on many farms, although the economics of installing a mill-and-mixer are doubtful if less than 70-100 tons of concentrates are used annually.

If a 10-sow herd were the only livestock enterprise on a farm, it would certainly be advisable to buy mixed rations. But if the total livestock on the farm consumed over 100 tons annually, home-mixing would be profitable, provided three basic essentials were borne in mind: buying, mixing and feeding correctly.

If a foodstuff is temporarily cheap, buy it if it will store satisfactorily and, within reason, be prepared to alter the whole scheme of rations to make use of it.

A close watch must be kept on price trends, and some trouble taken to learn the relative merits and food values of different feeds. Opportunities often present themselves to buy food to great advantage.

Balance Your Rations

Work out rations, either from your own knowledge of the feeds available, or if in doubt, consult advisory services available to you. Take care that starches, proteins, vitamins and minerals are balanced, and, even if you think you have everything covered, a little professional advice costs nothing, and is usually worthwhile. Remember that de-

ficiencies will only come to light after the pig has lost money.

The actual process of mixing should also be carried out carefully, and a completely reliable person, who will follow the quantity instructions implicitly, should be entrusted with this job.

The farmer who mixes his own feeds need not be tied down to only two or three rations. It is quite feasible, and definitely economical, to have as many as five different mixes, specifically designed to meet (as cheaply as possible) the nutritional needs of all the different classes of hogs.

The ration, whether home-mixed or purchased, will cost a substantial sum, and consequently waste must, as far as possible, be eliminated. The feed should reach the pigs fresh and in exactly the right amount.

Feed Weighing Vital

The weighing of rations is vital in restricted feeding. With a sound layout, it need take very little extra time, and it will ensure accuracy. Guessing can never be closer than a pound or so, and even a graduated bucket cannot be relied upon because a slight change in the mix can affect the weight of a given measure considerably.

As far as the sow is concerned, exactness is not quite so critical, and her condition, rather than an arbitrary scale of rations, is the best guide. It is often worthwhile to feed sows individually to ensure that each gets its proper share, and a sow-feeding bail is a good investment.

As a general guide, a sow in fair condition on good grazing in early summer can do well on 3 lbs. of high-quality sow-and-weaner per day. Later in the year, when the quality of the grass is poorer, 4-5 lbs. will be needed, but this higher level must be fed before it is seen to be needed. In winter as high as 6 lbs. may be needed. Some strains may do well on less than these amounts, but any experiments should be cautious.

Just 99 years ago, the population of the U.S. was 31,443,000. Today it is over 5 times larger at 175,000,000. It doubles every 40 years.

Farm Facts

4. House Efficiently

The pig makes the money, while the pigman creates the right conditions for it to do so. Therefore, let housing be designed primarily for the pig's well-being, and let the comfort of the pigman come a close second.

The pig's basic need is for a dry bed, and shelter from draft. Insulation to retain body heat will keep the house warm, aided by restriction of air space. Every-

one knows the most popular and successful types of house; the factor often overlooked is the need to use them to the best advantage.

The principle, simply stated, is that a building, representing a sum of capital invested, is earning no interest unless it is being used; and not earning enough unless it is used to capacity. The only possible excuse for leaving pens empty is to allow thorough cleaning and disinfection.

Not only should the pens have pigs in them but they should be full of pigs. Frequent moving, though it takes time, is thus economically justified. As far as the small herd is concerned, a number of pens of different sizes will be required, as such a unit may be forced to keep every odd pig until it is precisely the right weight for slaughter.

Scientists estimate the sea is as productive of organic food, acre for acre, as the land.

Taking a pen designed for eight finished pigs as an illustration, ten or 12 younger pigs could comfortably live in it for some weeks until the first couple of finished pigs have been sold from a larger pen. Two bunches would then be changed over. Going a step further, when a couple more of the hogs have gone to the market, the remainder could again be moved to a smaller pen, and more young pigs bought. In this way, the house is kept full, and the capital is earning the maximum interest.

Similarly, with breeding stock, only a very limited number of expensive farrowing pens should be built, and if there are more sows than places, the sows with litters over three to five weeks old should be moved into cheaper accommodation.

5. Record Your Stock

Since every chain has a weak link, the chain of farming operations will also have its weaknesses. They are not always obvious at the time and can only readily be seen in their cumulative effect over a period. Thus, the annual balance sheet may show that the pigs are losing money, and then perusal of the pig records may show that weaners are, on the average, too small, or finished hogs taking too long to reach slaughter weight.

A confusing mass of statistics is not wanted, merely a simple means of knowing how each pig has done, and thereby gaining some idea of what it may be capable of in the future.

Most important is the performance of the individual sow. To get a picture of a sow's merits, it is necessary to know the numbers born, numbers reared to

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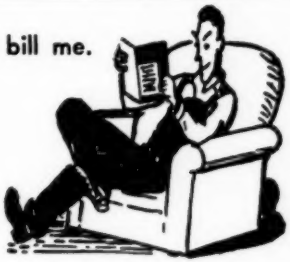


Here's a sketch of our farm where we publish Farmer's Digest. Our 200-acres are planted to corn, alfalfa, grass and trees. We farm — and we publish our magazine on a farm — because we believe that's the only way we can know what other farmers want to read. Farmer's Digest is probably the only farm magazine in the world published on the farm by farmers.

eight weeks and weight at eight weeks. Then the grading, speed of growth and food conversion of the progeny is required if the information can be obtained. And, lastly, regularity of breeding. On the basis of these results, culling should be practiced, and if the herd is to be improved, culling must be really rigorous.

Apart from the sows' records, it will be necessary to know the total amount of food consumed by the pigs. Finally, a careful record should be kept of all financial transactions, including home-grown feed, straw, extra labor and so forth, which must be charged against the pig unit.

If the system is to work, the records will have to be kept right up-to-date, which means noting every event at the moment it happens. Pigs change so rapidly, and need such a vast amount and variety of work in tending them, that by Saturday morning the events of last Monday are as a half-forgotten dream. The best thing is to keep a diary, preferably one that the pigman can carry with him. Everything goes into this, and then a permanent record can be compiled from the entries, say, once weekly.

It is a good idea to rule three columns down each day's page, one for sows due to farrow, one for sows due for weaning, and the third for sows at the 21st day after service, who may be returning to the boar. Then the pigman knows what to expect.

6. Employ a Good Man

Although a 10-sow herd is only a part-time job for a man, it would be a mistake to underrate the necessity for employing the highest quality labor to look after it. Pigs are as sensitive as dairy cattle or laying hens to their management, and if they are to give of their best, it is essential that they should be looked after with the greatest care, sympathy and attention to detail—for details add up.

"As soon as man began to supplement the hunting of game with the cultivation of crops, he became a farmer and started the longest uninterrupted gamble in history."

— Sir Miles Thomas

The normal routine attending of feeding, cleaning, littering, and so on, will bring in the normal return to cover costs of production; it is the "little extra" that brings in the profit.

Apart from this, labor represents only a small proportion of costs, and if an extra 10 per cent spent here can bring in another 5 per cent profit, that is obviously good business, for the wages

are invested in the pigman, and must pay their interest like any other investment.

The type of man wanted is one with a real understanding of stock, capable of seeing things from the pig's point of view, and conscientious in attending to their smallest needs. Such a man will keep the unit running smoothly by carrying out the work thoroughly, and at the right moment, *e.g.* giving the iron injection to baby piglets three days after birth, or getting a sow in to farrow a week before she is due.

It should go without saying that a good man is worth paying well, and some sort of production bonus is an added encouragement. He will certainly feel pride and pleasure in regarding a sturdy litter of pigs, but a bonus and a word of praise make it doubly worthwhile.

It is, after all, exacting work, for stock recognize no holidays, nor regular working hours. If the pigman is contented, the pig unit will thrive and run smoothly, and if the pigs are well managed and thrifty, the herdsman will feel satisfaction. Each will benefit the other.

7. Market Efficiently

One often finds, particularly where pigs are kept in small numbers, that while the stockmanship and general management leave little to be desired, very little attention is paid to marketing, and consequently profits, which could be secured, are lost.

So many people who keep pigs in a small way sell them by merely taking them to market and hoping for the best. There always seems to be more disappointments than successes in this method, and even if one is not satisfied with the price obtained, one hesitates to take the pigs home again for fear of bringing in disease.

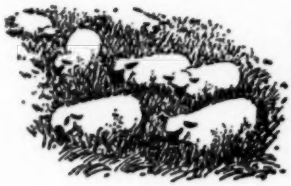
If only a few pigs are needed by the market and a lot are available, great care is taken in their selection, and only hogs which are known to grade high are used.

After that, the smaller yards which are used for heavy hog production are filled, and the remaining pigs sold to feeders who always seem prepared to pay a premium for pigs of this size.

If at any time the price of young hogs is high enough to yield more than the current price of finished hogs, then we know from our breeding and financial records that it is worth selling a considerable proportion of the pigs at 120-130 lbs., and again filling the bacon pens from the weaner yard.

Marketing is always the step to profit or loss in a hog operation and thus merits careful planning by the pig farmer.

Money from Feeder Lambs



Farmers are overlooking a good bet finishing out western feeder lambs, this Indiana farmer believes . . .

Condensed from Breeder's Gazette

Simon M. Schwartz

WITH so much emphasis these days on beef and pork production, many farmers are overlooking a good bet on finishing out western feeder lambs.

Luther Yager, Adams county, Indiana, beef and sheep farmer, is doing well with such a project. He has raised feeder lambs for the past five years and last year was his most profitable.

Each April or May, Yager receives about 450 to 500 white-faced Merino feeder lambs. These lambs are yearlings when he receives them and come from Western Texas.

The Hoosier farmer buys them through Producers Marketing Association, and has them trucked from the stockyards near Indianapolis, to his farm. He places an order for the lambs well in advance of the delivery date.

Lambs Make Meat

The lambs, when they arrive at the Yager farm weigh from 60 to 80 pounds, with an average weight of about 70 pounds. When they are marketed along in September or early October, they will average about 100 to 110 pounds. Yager's intention is to put from 30 to 40 pounds on each lamb before marketing.

The nice part about the lamb project, Yager says, is the little work associated with it. Yager turns the flock out on pasture and this is all they eat. No grain is used. His pasture is a mixture of Birdsfoot trefoil, alfalfa and brome. Yager permits the lambs to roam over considerable acreage, along with his herd of beef cattle.

The lambs and steers get along well and the fact that steers are in the same field with lambs discourages dogs and other animals from attacking the lambs, Yager said.

A Good Cash Crop

Since he is almost exclusively a grass and livestock farmer, Yager says the lamb project is ideal and a good cash crop for rolling or hilly fields where corn

Reprinted by permission from Breeder's Gazette, Columbia, Missouri

or other grains might not do well.

In addition to pasture, the lambs have free access to salt. Yager has three ponds on his farm and the lambs not only drink from the ponds but he runs a pipe line from one of the ponds into one of his pasture fields. The line goes to a water tank with a floating valve and the animals help themselves to water whenever they are thirsty.

Yager loses few animals. Last year he lost only four out of a flock of almost 500. He has not had any disease trouble and the Hoosier breeder reports that as long as the lambs have access to plenty of good pasture, disease is not likely. During the hot months, shade is available to the flock.

Sells to Packing Firm

Most of Yager's lambs, on marketing, go to eastern markets. He sells them through a large packing firm.

Yager says that he tries to make a profit or a difference between the buying cost of the flock and the price he receives on marketing them, of at least 25 per cent. Some years it runs a little higher, some years not quite that much. But a difference of $5 per head means $2,500 for Yager when he fattens 500 head and anything above that is, of course, welcome.

This Indiana breeder believes that the livestock farmer who stays in the feeder lamb business year after year will show a profit.

Get A Good Corn Stand

Do you want to harvest an extra 1,000 bushels of corn from each 40 acres you raise this year?

Jim Morrow, Purdue University extension agronomist, says it can be done. How? Get a good stand of young corn this spring. Assuming adequate drainage and reasonably good soil fertility and tillage, Morrow lists these fundamentals in obtaining a good stand:

Have the planter in first rate condition and adjustment.

Use a split boot attachment to place not more than 30 pounds of nitrogen and potash an acre in the row.

Keep driving speed under three miles an hour. (Two miles an hour would be better.) If you drive six or seven miles an hour when planting, Morrow recommends using the modern, side banding fertilizer applicator.

—*News from Purdue*

Your Herd May Produce Protective Milk

You may soon sell milk that is anti-arthritic, anti-hay fever or anti-poison ivy . . .

Condensed from
Milking Shorthorn Journal

MAN has long known of the high food value of milk, but work is just beginning in the field of establishing the therapeutic value of milk.

Immunization will be accomplished by the simple act of drinking a glass of milk. This will mean the end of sore arms presently associated with vaccinations. No longer will mothers dread the series of "shots" that are required to protect children against many dreaded childhood diseases.

Use superphosphate to prevent loss of nitrogen in manure. Apply 2 pounds per cow per day in the stable gutter, or immediately before or after bedding in loafing or feeding pens.

It will be a day of relief for sufferers of various and sundry allergies. Included in these is the hay fever caused by ragweed pollen of which there are more than 14 million victims in the United States. It may provide a way of relieving if not eliminating certain forms of arthritis.

The above speculation is what Dr. W. E. Petersen, Professor of Dairy Industry, University of Minnesota, sees in the future if subsequent research lives up to expectations. Dr. Petersen has been conducting research toward developing "protective milk" since 1950.

Scientists have known of the built-in protection of Colostrum milk since 1892. But it was 1950, Dr. Petersen says, when it was discovered a cow's udder was one of the most prolific producers of disease antibodies. Antibodies, he explains, are the minute organisms produced to combat and destroy certain disease causing bacteria and viruses.

The 1950 discovery paved the way for the work of Dr. Petersen and his colleagues. To date, tests have been conducted on more than 100 known disease bacteria and viruses. The big effort, however, has been directed toward two major fields—infant diarrhea, the number one baby

Reprinted by permission from Milking Shorthorn Journal, 313 S. Glenstone Ave., Springfield, Mo.

killer in Mexico, and certain forms of arthritis.

Although Dr. Petersen describes the results of tests to date as "unbelievable," he cautions that "protective milk" is not a "cure all." Why isn't it? Because, as he describes it, some bacteria and viruses are able to co-exist with their antibodies.

Dr. Petersen is careful to point out that the development of "protective milk," is still in the experimental stage.

One of his early experiments to test the effectiveness of "protective milk," was with calves. Two groups of eight calves each were used. Certain disease carrying bacteria were injected into all 16 calves. Half of the calves was given "protective milk" carrying antibodies of the injected bacteria, and the other half received normal milk. Of the calves receiving "protective milk," none showed any ill effects from the injected bacteria. Seven of the eight calves that did not receive the special milk died.

U.S. agricultural exports for the year ending June 30, 1959, are expected to total at least $3,800,000,000, a little less than last year but still one of the best years on record. At this rate, American farmers are exporting the output from one acre out of every six.

Presently, testing is underway using "protective milk," against certain forms of arthritis in humans. Approximately 30 persons are participating in the tests. One of the subjects drank the milk for a period of 35 days in the early part of 1956.

To date, the subject has experienced no further symptoms or attacks of arthritis. "The others," Dr. Petersen says, "have not shown such spectacular results, but if subsequent tests live up to expectations, 'protective milk' holds great promise for sufferers of this affliction."

Results of the field tests on infant diarrhea now being conducted in Mexico City will soon be known. Again, Dr. Petersen and his colleagues are optimistic. The reason for the tests is because of the high incidence and severity of the disease in that city.

The clue that "protective milk" might be at least a partial answer to the diarrhea problem in infants came from a mortality study in Stockholm, Sweden. Stockholm is reportedly one of the most sanitary cities in the world. Mortality studies among infants showed the death rate of breast-fed babies to be only one-third that of formula-fed babies.

This study led to the theory that breast milk contained a

built-in protective mechanism. Work was initiated to reproduce this same protection in cow's milk.

"Protective milk," according to Dr. Petersen, "is not yet ready to be released for commercial production. More work and more testing are necessary to prove its therapeutic feasibility. When that is done, it still must undergo a prolonged testing and trial period under supervision of the medical profession." But he again expresses optimism regarding both time and its proved therapeutic value.

One fact, regarded by many until recently as superstition, was proved to have a scientific base through Dr. Petersen's work. It has long been said by some that drinking goat's milk would immunize the person against poison ivy. In his work, it was discovered that if a goat ate poison ivy, her milk would contain antibodies against infection.

The reason that cow's milk does not contain antibodies against poison ivy is that cows will not eat the poison ivy plant.

Ideally, it takes about three to four weeks to produce the disease protective antibodies in milk. However, it can be done in a matter of hours.

The most effective way, according to the findings of the Minnesota scientist, is to infuse the desired antigens into the cow's udder two weeks prior to the expected date of freshening. Then, as soon as the milk is suitable for human consumption, it contains an abundance of antibodies against the infused antigen or antigens. Antigen is a collective term describing disease causing bacteria and viruses.

Lactating cows will also produce "protective milk" by the same process of infusing the antigens into the udder. Experiments show this is a quicker method of producing "protective milk." A lactating cow will produce antibodies in a 24-hour period. However, she will not produce antibodies in such abundance nor will she produce them over a prolonged period as will the cow receiving the antigens just before freshening.

Few insect-carried diseases harm the insects that carry them.

One of the most encouraging discoveries in Dr. Petersen's work is that the antibodies in "protective milk" will survive pastuerization, evaporation and even drying. "To handle this in commercial quantities," he says, "will require some changes in methods and equipment, but it can be done."

Dr. Petersen explains that it is not his line of work to suggest practical methods of commercial

production and distribution of "protective milk" when it becomes a reality, but he does have some ideas.

One method he believes would involve a contract between producers and processors. The producer who would be equipped and desirous of producing "protective milk" would enter into a contract with a processor. The producer would produce milk carrying certain pre-determined antibodies. The processor would of course guarantee him a market for this milk, and would be equipped to process the milk so as to guard against destroying the antibodies.

Preliminary tests indicate that "protective milk," to be effective, must be taken in quantity amounts. In the arthritis tests, subjects drank one quart of "protective milk" per day. One subject sipped the milk throughout the day until the full quart was consumed. The others drank a pint each in the morning and afternoon. The sipped milk showed no beneficial results while the milk taken at the rate of a pint in the morning and afternoon showed good results.

Although the work has not been directed at incidental immunization, by the intake of normal milk, Dr. Petersen says that the possibility of incidental immunization could account for many of the healthful qualities of milk.

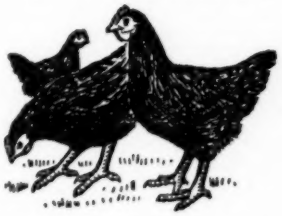
Who knows, should subsequent tests prove conclusively that "protective milk" will turn out to be an additional weapon in man's continuous battle against disease, old "Bossie" may become a walking medical supply in addition to supplying man's best food.

Agriculture Offers a Bright Future

Agriculture offers a bright future to the young men and women of our country. A recent U.S.D.A. study indicates farm production must increase by about one-third in the next 15 to 20 years if we are to meet the demands of our growing population. Experts predict the U. S. population will exceed 210 million people by 1975. Yet, land available to produce the necessary food and fiber will diminish. Furthermore, it is expected that there will be a decrease in the number of farms and farm workers. So fewer farm people must feed a greater population.

—University of Maine

Cannibalism, Its Causes and Cures



Vice in the hen house can lead to heavy losses . . .

Condensed from
Farmer And Stock-Breeder

THERE are thousands of birds which will not be reaching market because of this vice. That alone should put any poultry keeper on his guard the moment any sign of vice appears, for it is automatically a reduction of his profit. The common vices among poultry are feather plucking, cannibalism, egg eating, depraved appetite and toe picking.

Feather plucking: The victims present a ragged appearance and soon have large, bare, deplumed areas. Feathers are scattered around and the culprits can often be seen in action or struggling to digest the results of their activities.

Though the signs are obvious, the causes are not so obvious. Feather plucking is often attributed to overcrowding and boredom. The birds are closely confined for long periods with nothing to do and so start feather plucking. It may only be a small mark on the feather of the victim which starts it off but once started it is difficult to stop.

This condition is not limited to birds kept indoors under intensive conditions. It can also be seen in birds on free range. Here the cause may be poor feathering, which may be nutritional or hereditary.

Dietetic deficiencies can also give rise to feather plucking. Diets containing a high percentage of corn meal, and also lack of protein, shortage of salt and lack of hard grain have been blamed. The presence of external parasites cannot be overlooked. Last, but by no means least, birds which appear to enjoy persecuting their weaker brethren may be ringleaders which start the process.

What's to be done about feather plucking? First of all, make sure by keeping a careful watch on the birds that there are no "bullies" at once. External parasites can be checked easily enough and appropriate insecticidal treatment given.

If you are feeding a good proprietary brand of balanced ra-

Reprinted by permission from Farmer & Stock-Breeder, Dorset House, Stamford St., London, S.E. 1

tion then the chances are that dietetic deficiency is not likely to be the cause. However, the feeding of raw meat in the form of lights has proved quite effective in stopping feather plucking. The idea is to give the birds their fill of blood and meat. The inclusion of oats in a high corn ration has proved beneficial and also the feeding of soaked grains. The American "salt treatment" advocates increasing the salt content of the diet to 3 per cent for a week.

By far the commonest cause of feather plucking in my opinion is overcrowding, shortage of feeding space, and boredom. Avoid overcrowding and keep the birds occupied by providing green stuff for pecking. This should be placed in racks or suspended about 12 inches from the floor. A little grain sprinkled on to straw bedding will find work for idle beaks and maybe prevent worse activities from starting.

A banyan tree in India has so great a spread, that 7,000 people can stand in its shade.

The ultimate cure is undoubtedly debeaking. This can be carried out efficiently and painlessly with a debeaking apparatus and there is no excuse for more rough and ready methods. Plastic spectacles and aluminum "peck guards" are also available for the prevention of feather plucking.

Cannibalism: This amounts to feather plucking carried to its ultimate conclusion, as the cannibal, not content with just plucking the feathers from its victim, will go on attacking the body tissues and finally kill it.

Eaten Away

The causes of cannibalism most commonly seen are those associated with injury to the area of the vent at time of laying. A slight tear of the vent with hemorrhage or a complete prolapse attracts the cannibal and recently several cases have been examined in which two-thirds of the entire abdominal contents have been pecked away through the vent.

Extensive bruising and injury following severe feather pecking are the result of cannibalism. The causes of cannibalism are the same as the causes of feather plucking with the addition of these injuries to the vent or for that matter any other injury in which blood is released or raw flesh exposed.

The prevention of cannibalism lies in the immediate detection and isolation of any birds with injuries, especially pullets coming into lay, and the application of the suggested remedies for feather plucking. Too much stress cannot be laid upon the

importance of avoiding overcrowding and boredom; eradicating external parasites; the value of high protein food; and properly conducted debeaking.

Egg eating: More of a bad habit than a vice, this condition can be an awful nuisance. It is often associated with one or two ringleaders. They break the eggs and it is not long before the rest of the flock are joining in.

Careful watching of the flock will enable you to detect the offenders at once and they should be speedily dispatched. If, however, a large number of birds have acquired the habit then further action is required. Debeaking will help. Have nesting boxes about 18 inches above the floor; make frequent collections of eggs; put china eggs in the nest boxes; and provide nesting boxes with false floors or egg traps. At the same time check up on the diet and the possible presence of internal parasites.

Depraved appetite: This means that birds will eat virtually anything, litter, grit, concrete, their own droppings, eggs and so on. The causes are internal parasites (worms or coccidia), abnormal bacteriological infestation of the bowel, dietetic deficiencies or managemental failures.

Check by Post-Mortem

Internal parasites or abnormal bacterial infection of the bowel can be easily checked by post-mortem examination of an affected bird and fairly easily put right. As for dietetic deficiencies and managemental failures, you have the resources of your feed dealer and your veterinarian to call upon.

Toe Pecking: This can be a serious habit in chicks. It is more commonly seen in chicks raised in houses which are brightly lit by the sun, the chicks being bedded down on peat moss or something dark. The light glints on the toes and so pecking begins. The losses can be serious. The only answer is to supply deeper bedding, i.e., cut straw or shavings, dress damaged toes with tar and limit the light coming into the house.

Vice in poultry is a serious business and the only way to deal with it is to find the causes and remove them.

"Hard" alfalfa and clover seeds are perfectly healthy seeds, but they soak up water more slowly than normal seeds and therefore will not germinate as soon in the field. If frost or drouth occurs after the seedings emerge, the slow germination of hard seeds may actually be beneficial.

Vertical Integration in Livestock

More integration is definitely in prospect for the livestock industry, but it won't move as far or as fast as it has in broilers . . .

Condensed from Agricultural Marketing

Gerald Engelman

VERTICAL integration within agriculture has grown rapidly in recent years, and it has taken many forms.

In the production of hogs, for example, integration may refer to either sow-and-pig contracts or feeder-pig contracts.

With the sow-and-pig arrangement, bred sows are leased to the farmer who then finances the production program on his own. With the feederpig contract, the farmer usually contributes only the housing, equipment, and labor necessary for production; a feed company or other integrator provides everything else.

Integration in the cattle industry is something entirely different. It occurs mostly in the large commercial feedlots of the West Coast States and may extend either forward from the rancher or backward from the packer or chain store. In the first instance, the rancher retains ownership of the cattle through the feeding period; in the second, the packer or chain store itself owns the cattle.

The growth of the large commercial feedlot is, perhaps, one of the most significant developments. Triggered by the West's increasing demand for "fed" beef, commercial feedlots have expanded rapidly. About one-third of the fed cattle in this country comes from the feedlots in the West.

Often referred to as "beef factories," these feedlots are in continuous operation the year around. They feed anywhere from 1,000 to 30,000 head of cattle annually, with livestock moving in and out of some of the larger lots every week of the year.

Although the large commercial feedlot is not always a contract operation, it has, to some extent, given rise to contractual arrangements for the feeding of beef cattle. Such contracts, however,

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vary considerably. Some are written; others are only verbal.

Contracts also vary in the extent of their coverage. Usually, though, the feedlot operator receives a daily per head handling fee, the actual cost of the ingredient feeds, and perhaps an allowance for the cost of milling the grains.

At present, less than half the cattle fed in western commercial feedlots are handled under custom arrangements. Packers, however, have been feeding some cattle for the past 10 or 20 years. Several chain store companies also entered the cattle feeding business during World War II when meat supplies were scarce.

Custom feeding arrangements are well suited to both packers and chain stores. Yet, neither of these marketing groups have taken a very active part in the beef feeding business. Some chain stores have abandoned their operations, and many packers appear to be "in and out," depending on the profit prospects.

Both the commercial feedlots and the custom feeding arrangements appear to be more characteristic of the West than the Corn Belt. A few large commercial lots are located in the Missouri River area, and some contract feeding of cattle is carried on in the Corn Belt. But, most of these contracts are production credit arrangements for feeding commercial protein supplements manufactured by certain firms.

Integration also has extended into the swine industry, but on a somewhat smaller scale. Marketing specialists figure about 2 to 5 per cent of our production comes under contract arrangements.

During the past year, two general types of contracts were available to hog farmers—the feeder-pig contract and the sow-and-pig contract.

With a feeder-pig contract, the integrator, who is frequently a feed dealer, supplies the pigs and their feed. He also handles management problems, takes care of veterinary expenses, and later takes the hogs when they are ready for market.

Both calf pneumonia and scours generally are aggravated by improper housing. Veterinarians say calf pens should be constructed and situated to facilitate easy cleaning, to provide dry quarters and adequate ventilation.

The extent of this type of production contract is limited by the available supply of pigs. Feeder-pig contracts are most often found in the South and in the Middle Atlantic States.

The sow-and-pig contract provides for leasing bred sows to

farmers. These contracts vary greatly as to the amount of control and management exercised by the integrators. Some contracts require growers to adopt the multiple farrowing system and to use the feed company's supplements as well as specified housing and equipment. The farmer, however, must make his own arrangements for production credit.

One feed company has a sow-and-pig contract that provides for a 50-cent bonus above the high-low average for No. 1 hogs. The No. 2 and No. 3 hogs are sold at the local market price.

A number of sow-and-pig contracts have been introduced along the fringes of the Corn Belt, in the Southeast, and in north Texas, Oklahoma, and Kansas.

Most packers are exploring the possibilities of contract farming, and a few have already made contracts. Some feed companies also are promoting contracts.

Pig hatcheries have been tried for about 10 years in Iowa, Wisconsin, and Minnesota. Most of these have discontinued operations because of various diseases and parasites, which thus far have been difficult to control. If these problems are solved and pig hatcheries become truly successful, the plan will provide a tremendous impetus to swine integration.

Livestock cooperatives have already made progress in integration. Nearly all are studying the movement, and many are developing pilot operations to gain experience. Several are emphasizing grading and meat-type hogs. One group of cooperatives is pushing the establishment of swine-testing stations to develop meat-type hogs.

More integration is definitely in prospect for the livestock industry. But it is not expected to move either as fast or as far as broiler integration.

Integration, however, will aid in expanding hog production in areas other than the Corn Belt. Although swine production as a major enterprise probably never will move from the Midwest to the South and East, its growth in these areas will depend upon the availability of adequate feed supplies.

At the same time, the commercial feedlots of the West Coast will not supplant farmer-feeders in the Corn Belt during the next decade or so. There will be some growth in the number of cattle fed in these large feedlots.

Custom feeding by chain stores and meat packers probably will not expand as steadily. These marketing agents are expected to continue their fluctuating policy of moving into the livestock feeding business when the profits look good and out when the situation is not so favorable.

Is Bigger Machinery The Answer?

There's a tendency to "think big" in terms of machinery . . .

Condensed from Iowa Farm Science

David A. Link, Iowa State College

NARROWING farm profit margins have made it increasingly important to pay more attention to cutting production costs and to making efficient use of production funds invested. And farm machinery management is an important part of the over-all farm management picture. The machinery used in operating a farm these days represents a substantial investment—an investment which can be either well or poorly managed.

Engineering advances bring many new machines on the market every year, and many of them offer ways of doing a particular job or combination of jobs better. At the same time, however, this tends to make your machinery management job more complicated—both in terms of the machinery you have and in terms of what additional machinery you may want to get.

More Than "Care" . . .

There's much more to good machinery management than merely taking good care of your machines and operating them properly. This, of course, is important, but it's not enough just to be a good operator. You must use your machinery dollars in the best way possible. Otherwise, you'll find your potential profits dwindling.

If you've added acreage to your farm, for example, you've probably found some unexpected problems developing in relation to the size of your machines. It's quite likely that just increasing the sizes of your machinery in proportion to the increased acreage hasn't worked out. Chances are that this is because your machines still aren't quite big enough to do the job you thought they would. But, on the other hand, you may have ended up with machinery too large.

The widespread interest these days in 6-row corn-planting and cultivating equipment—where 2- and 4-row was once adequate—illustrates the current trend to "think big" when it comes to machinery. But is this the way

Reprinted from Iowa Farm Science, Iowa State College, Ames, Iowa

to look at it? Continuing research is turning up some clues in this regard. It indicates that bigger machinery isn't always the best answer. In many cases improved management of the machinery you have may come closer to a solution.

Let's take a quick look at a few of the highlights forthcoming from our research studies on machinery size and management and then take a deeper look into some of the "why's."

The Highlights . . .

Briefly, here are the three main points which have come from our studies on machinery size so far:

- The best size for any farm machine is the one which gives you the greatest return over the cost of buying, operating and maintaining it — *not* the size which, on the surface, may appear to give the minimum total cost or maximum total return.
- The capacity of a farm mahine for doing work does *not* increase in direct proportion to its size. In some cases you can gain more by streamlining your method of operating a machine than by simply getting a bigger one.
- Good care and maintenance are important in extending the useful life of farm machinery—lowering annual depreciation and, therefore, the costs of your machinery.

Our research up to now does not provide exact answers on what sizes of machinery are best suited for particular farms. The results are helping, however, to establish some guideposts along these lines. There are some definite characteristics — both economic and physical—related to machine size that can greatly affect a machine's usefulness to you. One of these is —

Cost . . .

There's more to "cost" than how much you pay the dealer to deliver a machine to your farm. Operation of the machine requires fuel, lubrication, repairs, labor, etc.—all of which add to the cost of the machine to you. There are also the total payments to be made if the machine is purchased on time. Or, if bought for cash, the return which would be made on that same money invested elsewhere in the farm business is a consideration.

A USDA economist predicts that by 1975 the average investment per commercial farm will be $80,000.

One convenient way to think of cost is on a yearly basis: that is, all of the money required to *own, operate* and *maintain* the machine for 1 year. This total annual cost includes some "hidden" fixed costs not always obvious. The most important of

these is yearly depreciation—the decrease in a machine's value in 1 year because of wear and age. Other costs of this type are those of taxes on the machine, of insurance for it and of housing for it.

Some of these costs vary with the size of a machine, especially the original price and, therefore, the depreciation. If a machine is "too large" for your farm, you will feel it through the larger price you must pay. But another cost, that of labor, behaves oppositely. More hours are needed to do a given job with a small machine because it works at a slower rate than a larger one. Thus, the labor cost usually is higher for a small machine than for a larger one. Other costs also vary with size.

The National Forests of America cover an area equal to the area of Texas.

For a given farm situation, total costs are high for a too-small machine but decrease as machine size increases and becomes more suited to the situation. Beyond this point where total costs are least, the total costs start increasing again as machine size becomes too large.

So, on the basis of cost alone, the desirable point is owning a machine somewhere near the minimum-cost size. But cost alone still doesn't furnish a complete picture. Another factor is—

Performance . . .

The performance of a farm machine also is related to its size. One of the most obvious effects of performance is on the rate at which a machine does work. This rate, in turn, often helps to determine the yield of the crop in which the machine works.

Corn planting illustrates this. Agronomists have found that net corn yields in central Iowa tend to decrease about ½ bushel per acre for every day that planting is delayed beyond May 17. This isn't true every year since it depends on the weather at planting time and throughout the remainder of the growing season; for any given year, this date may vary quite a bit.

But, to see what kind of influence this has, suppose that yield does drop ½ bushel per day after May 17. Then, for some reason, suppose you can't start planting 120 acres of corn until May 18. If you can plant 30 acres per day, you'll have the job done in 4 days. Your "losses" will total 15 bushels the first day, 30 bushels the second, 45 on the third and 60 on the fourth—for a total of 150 bushels. If, with a smaller machine, you could plant only 20 acres a day, your losses would have totaled 210

bushels, and, for a smaller planter, even more.

In general, a too-small machine will tend to reduce the yield of a crop in this way and consequently reduce the possible returns or revenue from that crop.

After all else fails, follow directions.

It's usually necessary to accept some timeliness losses because a machine which would make these losses negligible usually is far larger than the minimum-cost size. So the thing that becomes really important is neither the machine cost nor the total revenue in itself.

What does count is the difference between the two — the amount of the return or revenue over and above the machine cost —net return.

It has been found that the size of machinery for the maximum net return is larger than the size for minimum machine cost alone. This is generally true — though just exactly how much larger depends on how sharply timeliness affects yield. Timeliness may have little importance in an operation such as plowing but becomes of greater importance for planting and greater yet for harvesting.

At this point we've looked at some of the effects of machine size as related to cost and performance. The size of a machine also has important secondary effects on performance. Most prominent among those is the effect on—

Field Efficiency . . .

Field efficiency is the ratio of "useful" time on a job to the total time spent in the field. "Useful" time includes only that actually spent in driving down the row or swath. It doesn't include the time spent in turning at end rows, filling seed and fertilizer boxes, making adjustments, etc.

Relative time uses (minutes per acre) of 4- and 6-row corn planters operating at 4.5 mph on 1,200-foot rows.

Use of field time	Size of planter 4-row	6-row
Unit time losses per acre:		
Turning	0.50	0.49
Adjusting, cleaning, checking	0.54	0.54
Filling boxes	1.42	1.42
Total time loss per acre	2.46	2.45
"Useful" time per acre	8.3	5.5
Total field time per acre	10.7	7.9
Field efficiency (%)	76.5	69.4

The table summarizes the results of per-acre time studies of corn planting with 4-row and 6-row planters operating under similar conditions. For the 4-row planter, 10.7 minutes of field time were required per acre, and 8.3 of every 10.7 minutes was used in actually performing the planting operation—the other 2.4 minutes were spent doing something else. Thus, the field efficiency of the 4-row planter was $100 \times 8.3 / 10.7 = 76.5$ per cent. For the 6-row planter, 7.9 minutes of field time were required

per acre, and 5.5 of every 7.9 minutes were used in actual planting—2.4 minutes were spent in doing something else. So the field efficiency for the 6-row planter was 100 x 5.5 / 7.9 = 69.4 per cent.

Thus while the 6-row planter required less time in total to plant 1 acre (7.9 minutes as compared with 10.7 minutes for the 4-row planter), the 6-row planter was less efficient than the 4-row planter in the proportion of time spent in "useful" work.

The essential point illustrated by this example is this: If all other factors remain the same, the capacity of a machine will not increase in direct proportion to its size.

A willow sprout was planted in a tub of earth and nothing added except water. At the end of five years, the plant weighed 164 pounds, and the weight of the soil in the tub had decreased only 2 ounces. Where did the 164 pounds come from?

Suppose, as a further example, you planted corn with a 4-row planter and found you had planted exactly 10 acres in 107 minutes—10.7 minutes per acre as used in the last example. Without going further, you might suspect that, with a 6-row planter, you'd be able to plant half again as many acres in the same time—or a total of 15 acres. But this isn't so!

Using the figures from the previous example, you'd only plant 107 / 7.9 = 13.5 acres. A machine which is 50-per cent larger, in this case, increases capacity by only 35 per cent—not by 50 per cent.

The point from this example is that you can't expect to automatically double the working capacity of a machine by getting one twice as large and costing perhaps twice as much. Much of the reason for this is because of:

Time Losses . . .

A look at the unit-time losses in the table helps show why the field efficiency of the 6-row planter proved lower than that for the 4-row machine. First, the time actually spent planting corn is smaller with the 6-row planter. If the 4- and 6-row planters had the same field efficiency, each unit time loss per acre would be smaller for the 4-row planter. This isn't the case, however, since the per acre time losses are almost exactly the same for both planters.

It probably took longer to fill the fertilizer and seed boxes on the 6-row planter. But, since there were fewer fillings per acre, the total time per acre was the same for both sizes. The situation is similar for the other types of field losses—turning, adjust-

ing, cleaning and checking—shown in the table.

For any machine involving time losses similar to filling seed and fertilizer hoppers, there's a large effect of machine width on efficiency. This includes all such operations as drilling grain, applying fertilizer and harvesting. For these kinds of machines, just increasing the size of the machine doesn't help much unless the constant time loss per acre is reduced as much as possible.

You can't, for example, get the full benefit from going from a 1-row cornpicker to a 2-row picker unless you make some provisions for handling the corn that is picked with greater speed. By the same token, it's also possible to greatly improve field efficiency—and also the capacity of the machine for doing work—by paying more attention to these constant time losses in individual cases. You may find it better in some cases merely to increase the size of the seed and fertilizer boxes on a corn planter—or to increase the wagon capacity in a harvesting operation—rather than to increase the size of the planter or harvester.

Look Closely . . .

The results which we're obtaining from our studies may be helpful to you in looking more closely at your own farm machinery situation and improving the management of it. Our results indicate that you may sometimes more easily increase the capacity of your machinery just as much by reducing time losses as by increasing machinery size. Remember, too, the importance of proper care and maintenance in extending the useful life of your machinery (and your investment in it).

Deep Secret

So, do you know how to count the fish in a pond? We have just found out.

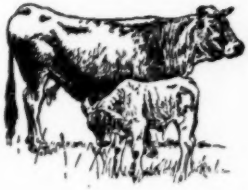
The State Fish and Game people know how to do it without getting wet all over.

They go out on the pond in a boat and net a number of fish, then tag them, and let them go. Once the fish have had all the time they need to stir around and make a lot of new friends in mixed company the Fish and Game people go out on the pond again and net some more.

The percentage of fish with tags, and the total number of fish in the original catch give them the number of fish in the pond.

—Monadnock Ledger

Controlling Sex of Offspring



Heifer or bull calf? In the future, you may name which it will be . . .

Condensed from Minnesota Farmer

Ralph Wayne

RECORDS of efforts to predetermine the sex of offspring goes back as far as 2,200 years before the birth of Christ. Aristotle in Greece, 400 B.C., suggests that if a male child was desired he should be conceived in winter and if a female, in summer. The direction that the bed stood was also considered important. Down through the centuries, several other ideas were tried. Some of the royalty in endeavor to produce a male heir to their throne followed various suggestions of the day. Unequally sound were the ideas of some farmers years ago that cows faced north when bred would be more likely to have heifer calves.

Modern science shows that something much more than these old ideas must be followed if the normal 50-50 ratio of sex in mammals is to be changed. The sex determiner in mammals is contained in the sperm cell. In other words, it is the father and not the mother that determines what the sex of the offspring will be. Two types of sperm cells are produced. One is a male producer and the other a female producer. Since these are produced in equal numbers there is the same chance that the offspring will be a male as a female. Therefore, anyone predicting sex will be right half of the time just from the law of chance.

In 1925, Lush working at Iowa State College, thought that the X and Y chromosomes of sex determinants may have slightly different weight and that they could be separated in a high-speed centrifuge. However, this experimental work showed the sex ratio could not be influenced by this procedure. In 1930, a German physician claimed that a vaginal douche of bicarbonate of soda or common baking soda prior to service resulted in a predominance of male offspring. Work of others did not support this and the practice was generally discarded. During the early 30's some scientists in Europe came forth with the idea of sep-

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arating the two kinds of sperm cells with an electric current. Over the years, this seemed to give some promise. In recent years, this work has been carried out at Michigan State University by M. J. Gordon. He has recently reported on his studies with rabbits.

The rabbit semen is placed in an electric cell. When current is turned on, the sperm cells can be seen under a microscope to swim toward one pole or the other. Those concentrating on the anode or positive pole are then collected separate from those collecting at the cathode or negative pole. Work of the European scientists showed that female producing sperm cells tended to concentrate at the anode and male producers at the cathode. This, incidentally, does not mean females are more positive than males.

Gordon reports that of the 167 rabbit offspring, 113 were correctly predicted. This is 67.7%. Eighty seven of the 167 offspring were the result of using female predicted semen. Sixty two of these 87 were females. This is 71.3% of the prediction or getting nearly three females for every male.

What practical application might this have? First, we must recognize these studies were carried out with rabbits and not cattle. But, there is no reason to believe that it wouldn't work as well with cattle. If it did, this would mean that some day semen would be available from breeding associations that produced primarily heifer calves. The value of such to a dairyman, of course, is quite apparent. Taking the results of Gordon's early trials with rabbits of getting 71.3% results of females would mean that one could expect close to three heifer calves for each male from this separated semen.

While it must be recognized this is the result of early experimenting and that further studies are needed to verify the results, it must also be kept in mind that further improvements in techniques may make it possible to secure even better results. At least it appears that we are on the threshold of possibly controlling the sex of offspring to a considerable degree, a matter that has baffled man since the earliest records.

Europeans use marigolds and primroses in soup. The Chinese cook water lilies with meat. Mexicans enjoy fried yucca. Arabs use rose petals as a base for preserves. The French make jelly out of violets. The English use alfalfa buds in salad, and daisies and dandelions are used for wine in many areas.

Watch Ketosis!

It sneaks up on high producing cows . . .

Condensed from Arkansas Farmer

LURKING in the shadows of many an American farm today is a disease threat which is just biding its time until dairy cows reach their years of highest production. Then it will strike suddenly, levying a heavy toll on milk production.

The disease is ketosis. Its toll right now is about $5,000,000 per year.

The problem occurs so constantly, among so many dairy herds, that it has been made a primary target as part of the 1959 drive for National Livestock Loss Prevention Year.

The worst thing about ketosis is that it generally strikes the high-producing cows. The American Foundation for Animal Health points out that it often appears in the years when these cows are yielding the most, usually from the second fresh period on. It is most likely to occur within a few weeks after calving.

There is no universal agreement on the exact cause of ketosis. Some authorities believe that the nutritional drain on an animal is greater than the nourishment supplied by the normal ration. Others feel that the endocrine glands may be unbalanced. Still others think that there is a joint relationship between these two factors.

There is general agreement, however, on one thing. In the latter stages of pregnancy, during calving and immediately afterwards, cows are under terrific stress. When the stress conditions become more than the cow can handle, her metabolism is upset and ketosis symptoms appear.

There are really two types of ketosis which the farmer needs to watch for. One is lactation ketosis, and the other is complicated or secondary ketosis. The first type usually appears two to four weeks after calving. Foun-

Reprinted by permission from Arkansas Farmer, Box 246, Little Rock Arkansas

dation authorities say it is probably the result of nutritional demands exceeding the supply. Cases of this type have been seen as early as a week after calving, and as long as 70 days after freshening.

The second type of the disease has been found in both dry and fresh cows, and even in steers. These cases involve the nutritional balance, but the upset may be started, or made worse, by exposure, starvation, indigestion, infection, foreign bodies in the rumen, cystic ovaries, displacement of the abomasum, peritonitis, or vaginitis.

Whatever the cause or type, signs of ketosis are likely to include loss of appetite, either high excitability or indifference, loss of weight, reduced milk production, incoordination and slight paralysis.

However, the news about ketosis is not all bad. One of the good things about it is that the disease can be treated with success if the veterinarian gets to the sick animal soon enough. Treatment consists of injections of sterile dextrose solution directly into the blood stream. In certain cases, the use of corticosteroids or the pituitary ACTH hormone is indicated. After treatment, a marked improvement generally occurs within 24 hours. Often it is necessary to continue treatment for several days.

The best chance of reducing ketosis losses, of course, lies in prevention of the disease. A good preventive program should include such rules as:

Protect milk cows against such stress conditions as exposure, disturbance, injuries and infections.

Provide cows with completely-balanced, nutritious rations to maintain milk production.

Refrain from making drastic changes in feed volume just before calving.

Provide plenty of high-quality hay and roughage.

Bring cows up to maximum grain intake as soon after calving as possible.

Provide comfortable, well-ventilated quarters, plenty of pasture and sufficient exercise.

The result of these steps can be $5,000,000 added to the income of America's dairy farmers each year. That is a goal worth shooting for.

Cotton Farmers voted overwhelmingly for marketing quotas in their December 15 referendum. Final figures showed 92.2 per cent of the vote favored marketing quotas for upland cotton and 88.5 per cent of the vote was for quotas on extra long staple cotton.

Twin Calves and Infertility

Are all twin calves sterile?

Condensed from The Journal Of Agriculture of Western Australia

F. C. Wilkinson, B.V.Sc., Veterinary Surgeon

MANY farmers apparently believe that all twins—irrespective of their sexes—are likely to be sterile. Some think that all female twins are sterile, irrespective of whether they are born as a pair of heifer calves or as the female half of a bull-heifer pair.

In actual fact, where twins are both of the same sex—two heifers or two bull calves — they should be perfectly normal.

It is only when twins consist of a bull and a heifer calf that there is a risk of the female being unable to breed. In such cases, the bull calf should develop normally and could be used as a herd sire if necessary. The heifer calf of such a pair *could* be quite normal too, but in nine out of ten cases it would be what is known as a freemartin and would be unable to breed.

In general appearances, a freemartin tends to resemble a steer, or male castrated early in life. As it develops to the yearling stage it fails to come into season and there is usually a lack of the normal udder and teat development. Such freemartins fatten readily and should be sold to the butcher as soon as profitable.

Incidentally, this freemartin condition of infertility is observed only in cattle and does not apply in the case of sheep, pigs, dogs or horses.

Why and How

Some knowledge of the mechanics of reproduction in cattle is necessary to understand why twins of like sexes are normally fertile and why twins of mixed sexes may or may not produce freemartins.

The normal pattern of reproduction in cattle is that the "cow comes into season" at about 21-day intervals. During this period an egg cell or ovum which has reached full development in the ovaries or egg-producing organs

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is expelled and passes down the oviduct or egg tube into the uterus or womb.

If the egg is fertilized by a male sperm at this stage it becomes the embryo which ultimately develops into a calf. During its period in the womb, the developing embryo is enclosed in a sac called the placenta. This sac is expelled during or after the birth of the calf and is usually referred to as the "afterbirth."

The placental sac contains fluid which protects the unborn calf from injury, and the sac itself serves as the connecting link between the mother and the developing foetus. It contains blood vessels and is attached to the calf by the navel cord and

Dwarf fruit trees, especially apple and pear varieties, are highly recommended for home planting. Horticulturists say the trees fruit early, bear an average crop and require less work pruning and controlling pests.

to the mother by cotyledons or attachments to the lining of the womb.

Identical Twins

On somewhat rare occasions, the fertilized egg on reaching the womb divides into two parts, each of which develops into a calf. These two calves are contained in the one placenta or afterbirth and being evolved from separate portions of the same egg they are always of the same sex and are identical, or almost identical, in appearance and in general make-up.

These identical twins, whether they be two males or two females, should breed quite normally.

Non Identical Twins

In the great majority of cases, the cow sheds only one egg at each heat period. Other animals, such as pigs, dogs and cats, shed a number of eggs and eventually give birth to litters of young.

On occasions, however, a cow may expel two or more eggs from the ovaries at the same time and as a very large number of male sperms are introduced at each mating, each of these eggs stands a good chance of being fertilized and the result will be twin, triplet or even quadruplet calves.

In animals which normally have multiple births, each embryo develops separately from the others in its own placenta or afterbirth.

In the case of twin calves, however, the two afterbirths often unite in the womb and consequently the two calves are nourished and developed by a common bloodstream.

Where the calves are both of the same sex—two males or two females—this linking-up of the

bloodstream has no ill-effects and the twins should be sexually normal with their breeding ability unaffected.

Where they are of different sexes, the sharing of the same bloodstream has the effect of preventing the full development of the female's breeding organs. It is believed that the male secrets a chemical substance which reaches the female embryo via the connected bloodstream in the placenta. This substance suppresses the development of the female reproductive system, especially the ovaries, which fail to grow into egg-producing organs. The female twin therefore becomes a freemartin.

The female does not apparently secrete any chemical potent enough to affect the bull calf which develops normally and is capable of breeding.

If the linking-up of the afterbirths does not take place and each twin develops independently of the other (as in normal multiple-birth procedure) both twins will be sexually normal, even though they may be of different sexes. In the case of cattle this is a comparatively rare occurrence and only about one twin heifer in every ten bull-heifer pairs is able to breed successfully.

Examinations of the afterbirths immediately after the birth of bull-heifer twins will often furnish a guide to the breeding potential of the heifer. If the two membranes are entirely separate there is every chance that she will be sexually normal. If they are joined together she will almost certainly be a freemartin.

Use of Aureomycin for Fattening Calves

Aureomycin was fed to steer calves at different stages of the feeding period and with different levels of grain feeding. One half of the calves were fed 100 milligrams daily for the first two weeks after they were brought from the range. These calves gained nine pounds per head more than those that received no aureomycin. The calves were redivided, one half being fed a heavy grain ration and the other a light grain ration. One half of the steers on each level of grain feeding received 50 milligrams of aureomycin per head daily and the remainder received none.

At both levels of grain feeding the aureomycin-fed cattle gained more, made cheaper gains, and were fatter at the end of 225 days than those receiving no antibiotic. The advantage from feeding aureomycin was slightly greater in the case of calves fed a lighter grain mixture. *—New Mexico College of Agriculture*

FARM BOOK REVIEWS

THE EDITORS

How About The Weather?

By *Robert Moore Fisher, Harper & Brothers.*

The author, a former weather officer with the U. S. Army Air Forces in the Second World War and presently with the American Meteorological Society, covers all phases of the weather.

The book is written in a very clear understandable form with 16 illustrations explaining the text. If you are interested in the weather and want to know more about it, this book will get you started in the right direction after you read its interesting pages.

Book sells for $3.75 from the publisher whose address is: Harper & Brothers, 49 East 33rd Street, New York 16, New York.

★ ★ ★

The Grafter's Handbook

Second Edition by *R. J. Garner,* Oxford University Press.

Amateur or professional gardener — here you will find the answers to everything you want to know about grafting. Nearly 250 pages of reading with 32 illustrations from photographs and 117 illustrations in line drawing make each step clear and understandable. This book sets out in detail almost every known method of grafting now in use and gives information on all the points in each method. Certainly this is one of the most complete books written on the subject.

Book sells for $5.75 from Oxford University Press, 417 Fifth Avenue, New York 16, New York.

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L. H. Simerl and Bruce Russel, United States Publishing Co.

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Third Edition, by *P. P. Pirone,* Oxford University.

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—*New Holland Grassland News*

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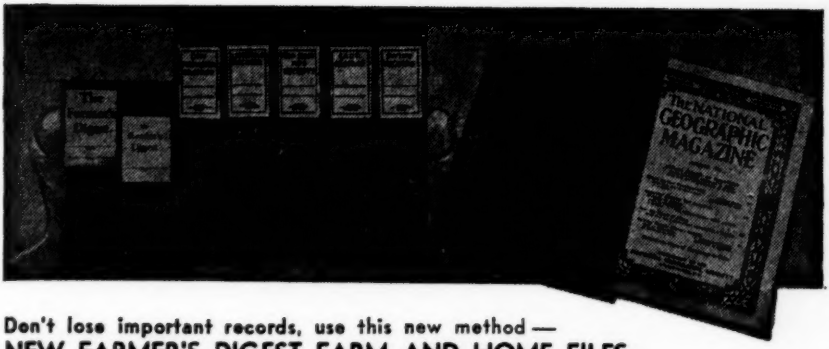

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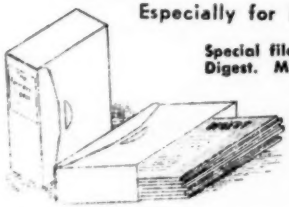

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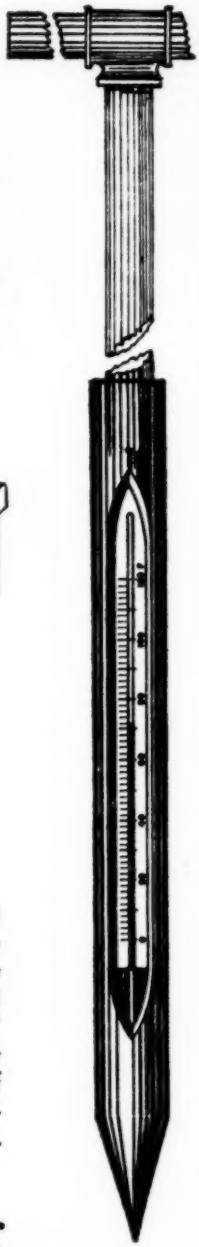

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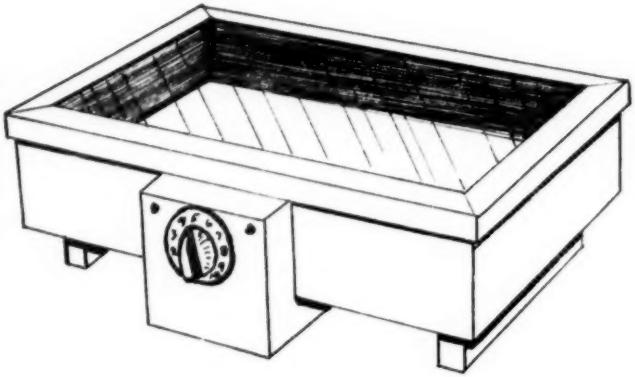

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